

Index by Author for Abstracts of

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Author	Title	Page
A.		
Abdala CG.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Abdelmalik TA.	The Role of Raised Cosine Shaping Filter Parameters in ECG Transmission Quality via WLAN IEEE802.11b Channel	92
Abdelouahed S.	Development of Telemedical Practice Platform: Application to Telesurveillance of Cardio-Respirographic Function	19
Abdelouahed S.	Objective Evaluation of Chronic Dysphonia Laryngeal Origin and Follow-Up of Their Treatments by the Implementation of Telemedical Device	57
Africano AES.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Agbasonu VC.	Design and Implementation of an Expert System for the Diagnosis of Blood Diseases in FMC Medical Laboratory – Owerri Imo – State, Nigeria	17
Ahmed CS.	The Role of Raised Cosine Shaping Filter Parameters in ECG Transmission Quality via WLAN IEEE802.11b Channel	92
Ahmed HI.	Cost Effective Fake Drug Alarming & Surveillance Support System Based on mHealth	15
Ahmed HI.	Ubiquit Maternal Care Using Information Communication Technologies with Meshing Approach	98
Airinei D.	Patient or Client? Who Decides in the Context of e-Health?	59
Akematsu Y.	Economics of e-Health: Measuring the Long-term Effect of Telecare	21
Akematsu Y.	New Framework of the Regional Medical System in the Aging Society: From a View of m-Health Economics	56
Akinmoyeje B.	Evaluation of the User Acceptance of Patients to the Adoption of EMRs in Nigeria	29
Akmim MB.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Alaneir S.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Alkmim B.	Tele dermatology: The Experience of a Telehealth Service in Brazil	72
Alkmim MB.	1,000,000 Electrocardiograms by Distance: An Outstanding Milestone for Telehealth in Minas Gerais, Brazil	1

Alkmim MB.	Telehealth to Provide Support for Healthcare Practitioners in Situations of Floods: A Brazilian Experience	76
Alkmim MBM.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Almeida L.	Towards Applying Cloud Computing Technologies to Support PACS in the Public Hospital Routine	97
Al-Qora'n L.	Safety Analysis of a Remote Patient Monitoring System with a Guideline Based Decision Support	64
Alsbjørn B.	Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage	77
Alves H.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Alves H.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Alves M.	Health Care Management with KeepCare	36
Amant F.	Implementation of an Electronic Prescribing System: keys for a successful deployment	39
Amcheslavskaya M.	Social Aspects of a Telemedicine	67
Amcheslavskaya M.	The Social Worker in TMC	93
Amine BM.	The Role of Raised Cosine Shaping Filter Parameters in ECG Transmission Quality via WLAN IEEE802.11b Channel	92
Amori E.	WEB 2.0 and M-Health Convergence	103
Andrade E.	Effect of Presence and Distance Teaching Methods on Nurses' Knowledge about Pressure Ulcer	22
Andreão RV.	Automatic Triage of Electrocardiograms	10
Andrijauskas K.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84
Andziukevicius G.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84
Antoniazzi JH.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Anyanwu A.	Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri	23
Aounallah S.	Objective Evaluation of Chronic Dysphonia Laryngeal Origin and Follow-Up of Their Treatments by the Implementation of Telemedical Device	57
Arthofer C.	Manufacturer Independent Interface for Cardiac Rhythm Disease Management	48
Aryeetey R.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Asllani N.	Health Center of Excellence – HCE	37
Assanta N.	Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations	79
Assis T.	Tele dermatology: The Experience of a Telehealth Service in Brazil	72
Atanasova B.	The e-Learning Platform Developed by Clinique Bohler	87
Atkov O.	Initial and Advanced Training Course for Telemedical	42

	Experts (Conclusions)	
Atkov O.	XX International Training Course “Modern Aspects of Telemedicine” (Conclusions)	106
Augustina O.	Perception of e-Health Services by Health Care Professionals (A Case Study of Federal Medical Centre, Imo State, Nigeria)	60
B.		
Baater T.	Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication	80
Bacigalupo R.	A Journey towards Implementation of Innovative mHealth in Health Services	3
Baevsky R.	First Experience in Using Telemedical System Heart Wizard DELTA in Individual Prenosological Health Monitoring in Russia	32
Baevsky R.	Space Medicine, Telemedical Ecology and Telemedicine: Prospects for Cooperation and Development	67
Balague C.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
Banitalebi B.	Smart Knee Guard: A Knee guard which warns harmful physical stresses on the knees	66
Barreiros M.	Melanoma Screening Using Telemedicine & eHealth - How an Organized Service Worked in an Effective Way	50
Bartz, CC.	Telehealth and Person-centered Care: Exploring the Possibilities	73
Bartz CC.	Telenursing: Advancing Care Delivery, Education and Research	81
Bavaresco C.	Brazilian Teledentistry Network Experience	12
Becker S.	User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project	99
Bella S.	Evaluation of Compliance to Telehomecare (THC) in a Group of Patients with Cystic Fibrosis (CF) in a Period of 2 Years	28
Belshi A.	Teleophthalmology in Action: Ptosis Screening in Albania	81
Benabdellah M.	Development of Telemedical Practice Platform: Application to Telesurveillance of Cardio-Respirographic Function	19
Benabdellah M.	Objective Evaluation of Chronic Dysphonia Laryngeal Origin and Follow-Up of Their Treatments by the Implementation of Telemedical Device	57
Benavent J.	LIFE 2.0: Geographical Positioning Services to Support Independent Living and Social Interaction of Elderly People	47
Benseny J.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
Berenyi E.	Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?	53
Beres M.	Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?	53
Bergmann K.	Implementation of Neonatal Intensive Unit Care	40

	Telemonitoring in Minas Gerais State, Brazil	
Bianciardi F.	Evaluation of Compliance to Telehomecare (THC) in a Group of Patients with Cystic Fibrosis (CF) in a Period of 2 Years	28
Billonnet L.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
Billonnet L.	Semantic Intelligence Interfaces for Ambient Assisted Living	66
Billonnet L.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Blanchfield P.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
Blank W.	Open Innovation in Health Care: The Role of ICT	57
Blozik E.	Clinical Protocols as a Measure for Quality Assurance: Experiences from a Large Teleconsultation Centre in Switzerland	14
Bobbià S.	Clinical Protocols as a Measure for Quality Assurance: Experiences from a Large Teleconsultation Centre in Switzerland	14
Bogdanski M.	Supporting Healthy Aging with Shared Self-Prevention E-Health Stations	69
Bohrn T.	Arterial Plethysmography Project in a Remote Region: Survey Results from 52 Volunteers in Rural Brazil	10
Bohrn T.	Opportunities in Fund-Raising and Telemedical Program Development	58
Bonde C.	Preliminary Experience with Text-Message Reminder Service for Ambulatory Patients	61
Bônes GT.	Android® Based mHealth TeleECG System in Ibiraiaras, Brazil	8
Bordignon A.	Android® Based mHealth TeleECG System in Ibiraiaras, Brazil	8
Bordignon A.	Mobilicare: A Health Monitoring System for Chronic Patients	53
Borkenfeld S.	The Virtual International Pathology Institute (VIPI): Idea – Implementation – Work	95
Born A.	Arterial Plethysmography Project in a Remote Region: Survey Results from 52 Volunteers in Rural Brazil	10
Borsoi MB.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Borsoi MB.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96
Botelho MR.	Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil	40
Botelho MR.	46through Telemedicine and the Information Management System to Meet the Needs of the Public Health	45
Brada J.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
Braive J.	Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project	102

Brasil LB.	Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy	47
Brauchli K.	Health Center of Excellence – HCE	37
Bruère N.	Multidimensional Assessment of E- Health Projects Sustainability	54
Bruski L.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Bulkova V.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
C.		
Cabaj D.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects	83
Cambiaso S.	An Online Platform as a Tool for Surveys by Patient Associations	7
Campos FE.	Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy	47
Campos G.	The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine	88
Canabarro APF.	Validation of Photo-ECG for Remote ECG Analysis	101
Capizzi M.	e-Health: Junior Doctor's Perspective and Future Implications	26
Cardace T.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Cardoso R.	Telepharmacy - Pharmaceutical Care – An Assistance Project	82
Cardoso RB.	Validation of Photo-ECG for Remote ECG Analysis	101
Castillo W.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
Castro JC.	LIFE 2.0: Geographical Positioning Services to Support Independent Living and Social Interaction of Elderly People	47
Cauwe F.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
Cauwe F.	Implementation of an Electronic Prescribing System: keys for a successful deployment	39
Cavalcanti P.	Effect of Presence and Distance Teaching Methods on Nurses' Knowledge about Pressure Ulcer	22
Cecagno F.	Mconf: A Webconference System Applied To E-Health	49
Celestrini J.	Automatic Triage of Electrocardiograms	10
Cervera A.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
Cesal M.	CANSCREEN - Early Stage Cancer Screening Based On Analysis of Blood Proteins, Evaluated by Special Cluster Analysis	13
Chan E.	eHealth Patient-Centered Solutions: New Opportunities and Strategies in the Pharmaceutical Industry	26

Chandra A.	Safety of Telephone Treatment Protocols in a Primary Care Practice	65
Chernikova A.	Space Medicine, Telemedical Ecology and Telemedicine: Prospects for Cooperation and Development	67
Chiappa E.	Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations	79
Chovancik J.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
Chris H.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
Christian O.	The e-Learning Platform Developed by Clinique Bohler	87
Cinqualbre J.	Witelm: A Foundation to Support Telemedicine Practice	105
Cop R.	IT System for Alarming of Possible Health Risks caused by Geomagnetic Storms	46
Correia AD.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Correia ADMS.	Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core's Report in Mato Grosso Do Sul, Brazil	68
Correia ADMS.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Correia ADMS.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Correia ADMS.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Correia ADMS.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96
Costa L.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Coster P.	Implementation of an Electronic Prescribing System: keys for a successful deployment	39
Cotognini C.	Evaluation of Compliance to Telehomecare (THC) in a Group of Patients with Cystic Fibrosis (CF) in a Period of 2 Years	28
Coumel S.	Connecting Nurses Program	15
Coyne T.	BEIP – Happy, Healthy and at Home Medication Management via Video	11
Crowe J.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
Cudd P.	A Journey towards Implementation of Innovative mHealth in Health Services	3
Cunha LR.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Cuzin-Kihl AK.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Czyżewska A.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation	83

Projects

D.		
da Motta Silva Correia AD.	Brazilian Teledentistry Network Experience	12
Da Silveira M.	Analyzing the Evolution of Semantic Correspondences between SNOMED CT and ICD-9-CM	8
Daley D.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
Daronco LC.	Mconf: A Webconference System Applied To E-Health	49
Dasho E.	Albania's Five Year Journey towards an Integrated Telemedicine Program	5
Dasho E.	Teleophthalmology in Action: Ptosis Screening in Albania	81
Davidova S.	The Bioresonance Approaches for Telediagnosis and Telecare	85
De Coster P.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
de Witte L.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31
Demski H.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Dermamels M.	Opportunities in Fund-Raising and Telemedical Program Development	58
Dérout F.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
Dezeljin D.	IT System for Alarming of Possible Health Risks caused by Geomagnetic Storms	46
Diamantidis CJ.	User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project	99
Dias MA.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Djenouni A.	The Virtual International Pathology Institute (VIPI): Idea – Implementation – Work	95
Djordjevic VR.	Gender Ratio in Engineering Disciplines: Why Are There Differences?	35
Dobashi BF.	Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core's Report in Mato Grosso Do Sul, Brazil	68
Dobashi BF.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Dobashi BF.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Dobashi BF.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Dobashi BF.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96

Dobosz B.	TelMedHome System - Fast and Cheap Monitoring of the Patients with Cardiovascular Diseases	85
Doğaç A.	A Personal Health Ecosystem: SharingCare	3
Dogac A.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Dondog J.	E-Health and Telemedicine Priorities in Mongolia	24
Dorairaj I.	Sustainable 24/7 Rural Healthcare with Eco Conservation	70
Dorokhova E.	Education in Telemedicine and eHealth	21
Dorokhova E.	Efficiency of the National Telecardiology Network: Influence of Tele-ECG at Heart Death Rate	23
Dumas J-M.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
Dumas J-M.	Semantic Intelligence Interfaces for Ambient Assisted Living	66
Dumas J-M.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Durango KM.	Integrated Model for Standardization of Electronic Clinical Records by Levels of Telehealth Center in Colombia	44
Durrani H.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Durrani H.	Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program	76
Dussartre A.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
E.		
Echevarria J.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
Eielsen OV.	Four Existing EMCCs Working as one Virtual Emergency Operation Centre (VEOC)	33
Eisen L.	Wrist-Worn Wearable Pulse Oximeter for the Remote and Continuous Health Monitoring Without Fingertip Sensor	105
Eising S.	Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?	20
Eliseeva T.	Social Aspects of a Telemedicine	67
Eliseeva T.	The Social Worker in TMC	93
Elliot J.	A Journey towards Implementation of Innovative mHealth in Health Services	3
Elor U.	Evaluation of the User Acceptance of Patients to the Adoption of EMRs in Nigeria	29
Elsner J.	Determination of Relevant First Aiders within a Volunteer Notification System	17
Erdenebayar E.	E-Health and Telemedicine Priorities in Mongolia	24
Erdenetsogt D.	The Mongolian Model of Telemedicine and Telepathology: Concept and Practice	91
Erlandsson BE.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24

Erturkmen GBL.	Security and Privacy Issues for enabling the Secondary use of EHRs in Clinical Research	65
Eryilmaz E.	Security and Privacy Issues for enabling the Secondary use of EHRs in Clinical Research	65
Estévez S.	Actigraphy for Measuring Activity Levels to Support the Treatment of People with Depression in the Community	4
Evgeniev I.	New 3D Vision is the Future of the Telemedicine	55
F.		
Fachel F.	Telepharmacy - Pharmaceutical Care – An Assistance Project	82
Ferreira R.	Algorithm Evaluation: Identification of Electrocardiogram R Wave	5
Ferreira R.	Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study	100
Festa P.	Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations	79
Fetter G.	Development of a Solution for Scientific Research in a Telecardiology Project in Brazil	18
Fiala M.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
Figueira R.	1,000,000 Electrocardiograms by Distance: An Outstanding Milestone for Telehealth in Minas Gerais, Brazil	1
Figueira RM.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Figueira RM.	From a Research Project to a Regular Telehealth Service: Redefining Objectives and Strategies	34
Fisk M.	Validation of the Telehealth Services Code of Practice for Europe	101
Fisk MJ.	New Skills and Knowledge Requirements for Telehealth and Telecare Staff: A UK Perspective	56
Fisk MJ.	The Need for a Clearer European Vision for Telehealth	91
Frank P.	Open Innovation in Health Care: The Role of ICT	57
Fucay L.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
Fujimaki M.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Fumicelli L.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution	36
G.		
Gafton I.	Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project	102
Ganbaatar G.	Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication	80
Gandalovicova J.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
Garcia YPV.	Integrated Model for Standardization of Electronic Clinical Records by Levels of Telehealth Center in	44

	Colombia	
Garcia YPV.	Integration Model Applied To Healthcare Services	44
Garçous R.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
Gasmelseid TM.	Multi-Agent Orchestration of Emergency Response in Saudi Hospitals: The Case of Al Ahsaa Area	54
Gaspar M.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Geisel PP.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Gençtürk M.	A Personal Health Ecosystem: SharingCare	3
Gengo J.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Georgieva D.	New 3D Vision is the Future of the Telemedicine	55
Gillain D.	Gérontotechnologies: State of the Art and Technology Validation	35
Glinkowska B.	Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis	59
Glinkowska B.	Telepulseoximetry Assessment for Elderly Patients during Physical Therapy – Preliminary Study	83
Glinkowski W.	Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis	59
Glinkowski W.	Remote Quantitative Diagnostics of Radiographic Images of Osteoporotic Vertebral Fractures	63
Glinkowski W.	Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database	73
Glinkowski W.	Telemedicine and eHealth in Poland: A Review (Polish Telemedicine Society Perspective)	78
Glinkowski W.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects	83
Glinkowski W.	Telepulseoximetry Assessment for Elderly Patients during Physical Therapy – Preliminary Study	83
Gluszak B.	Supporting Healthy Aging with Shared Self-Prevention E-Health Stations	69
Godoy S.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution	36
Godoy S.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42
Godoy S.	Knowledge of Nursing Professionals about Gloves Use	46
Godoy S.	Telenursing as a Health Promotion Strategy	81
Goff – Pronost M.	Multidimensional Assessment of E- Health Projects Sustainability	54
Gonçalves CCM.	Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core’s Report in Mato Grosso Do Sul, Brazil	68

Gonçalves CCM.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Gonçalves CCM.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Gonçalves CCM.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Gonçalves CCM.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96
Gonçalves G.	Health Care Management with KeepCare	36
Gonçalves G.	Monitoring Biosignals with Low Cost Wearable Sensors	53
Gordon N.	Safety Analysis of a Remote Patient Monitoring System with a Guideline Based Decision Support	64
Górecki A.	Remote Quantitative Diagnostics of Radiographic Images of Osteoporotic Vertebral Fractures	63
Górecki A.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects	83
Gorius C.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
Grangeiro J.	The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine	88
Grode J.	Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting	70
Grode L.	Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting	70
Gueorguiev V.	New 3D Vision is the Future of the Telemedicine	55
Gueorguiev V.	The Bioresonance Approaches for Telediagnosis and Telecare	85
Gutierrez D.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
H.		
Haasum K.	Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting	70
Haddad AE.	Brazilian Teledentistry Network Experience	12
Haddad AE.	Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy	47
Haddad AE.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Hamlil N.	19Practice Platform: Application to Telesurveillance of Cardio-Respirographic Function	19
Han K.	AIO HD Camera System	5
Hara K.	The Medical ICT Utilization to Perinatal Telemedicine in Remote Areas	90
Harju T.	Telemedicine Service Measurably Reduces the Costs of Healthcare	80
Hauschildt C.	Benchmarking eHealth in the European Union: Observations Relating to Security and Data Protection	12

Hayn D.	Manufacturer Independent Interface for Cardiac Rhythm Disease Management	48
Hecq JD.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
Hecq J-D	Implementation of an Electronic Prescribing System: keys for a successful deployment	39
Hildebrand C.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Hubler M.	Health Center of Excellence – HCE	37
Huptych M.	Proposal of a Multi-Layer Data Model for Electronic Health Care Record	62
Huttin C.	Feasibility Study to Integrate Implicit and Economic Information in Natural Language Processing Tools	32
I.		
Igharo I.	Pharmaceutical Care Actualization through Innovative eHealth Strategies	60
Imbrasiene D.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84
Ingelbeen B.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Iochpe C.	Mobilicare: A Health Monitoring System for Chronic Patients	53
Isaeva O.	Using Telemedical System Heart Wizard DELTA in Individual Prenosological Health Monitoring in Russia	32
Islam M.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24
Ivanov IE.	The Bioresonanse Approaches for Telediagnosis and Telecare	85
J.		
Jacquelet S.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Jakabl A.	Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?	53
Jan AA.	Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program	76
Jansa J.	CANSCREEN - Early Stage Cancer Screening Based On Analysis of Blood Proteins, Evaluated by Special Cluster Analysis	13
Jeschke S.	Determination of Relevant First Aiders within a Volunteer Notification System	17
Jordanova M.	Validation of the Telehealth Services Code of Practice for Europe	101

K.

Kanchanarin T.	Mobile Video Transmission System using IP Network Camera and MiFi	52
Kanomata MN.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Karlinska M.	Telemedicine and eHealth in Poland: A Review (Polish Telemedicine Society Perspective)	78
Karopka T.	Open Innovation in Health Care: The Role of ICT	57
Kayser G.	The Virtual International Pathology Institute (VIPI): Idea – Implementation – Work	95
Kayser K.	The Virtual International Pathology Institute (VIPI): Idea – Implementation – Work	95
Khanna J.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Khoja S.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Killcommons P.	Low-Cost Vitals Screening over Cellular Networks	48
Killcommons P.	Radiology and the Developing World	62
Kirimi O.	Youth Multimedia On-Line Engagement in Kenya	106
Kiyan C.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Kiyan C.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
Kirn B.	ECG Platform: From First Idea to User Driven Development	20
Kizlaitis R.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84
Klyver H.	Preliminary Experience with Text-Message Reminder Service for Ambulatory Patients	61
Koranda P.	InspectLife – Platform for Providing Telecare and Telehealth	43
Korč T.	InspectLife – Platform for Providing Telecare and Telehealth	43
Korca E.	Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education	78
Kosiedowski M.	Supporting Healthy Aging with Shared Self-Prevention E-Health Stations	69
Koufi V.	An Android-Enabled Mobile Framework for Accessing Holistic Emergency Medical Services on the Cloud	6
Kozmann G.	Dietary Logging and Analysis for Tele-Care Using Harmony Rules	19
Královec S.	Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications	64
Krasniqi J.	Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education	78
Krawczak K.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects	83
Kribben A.	User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project	99
Krzyminiewski R.	Telepulseoximetry Assessment for Elderly Patients during	83

Krzyminiewski R.	Physical Therapy – Preliminary Study TelMedHome System - Fast and Cheap Monitoring of the Patients with Cardiovascular Diseases	85
Kuchkarian F.	The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine	88
Kyng M.	From Many to One: Analysis of Information Models for Patient Centric Telemedicine	34
L.		
Laaveri T.	e-Health: Junior Doctor's Perspective and Future Implications	26
Lacerda VR.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Lajoie D.	The Power and Economic Impact of Network Based Medical Device Aggregators	91
Lamadrid IG.	Validation of Photo-ECG for Remote ECG Analysis	101
Lamprinos I.	Mobile Personal Health Application for Empowering Diabetic Patients: The Case within EMPOWER Project	51
Lamprinos I.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Lanczi LI.	ePortfolios in Postgraduate Medical Training – From European Junior Doctors' Perspective	28
Lanczi LI.	Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?	53
Lanzola G.	A Clinical Diary Supporting Remote Monitoring of Chronic Diseases	1
Latifi R.	Albania's Five Year Journey towards an Integrated Telemedicine Program	5
Latifi R.	Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education	78
Latifi R.	Teleophthalmology in Action: Ptosis Screening in Albania	81
Lazarotto de Lima G.	Arrhythmia and Ischemia Detection for a Sportsmen Monitoring System	9
Lecaj I.	Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education	78
Leite Rangel EM.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42
Lejeune C.	Gérontotechnologies: State of the Art and Technology Validation	35
Lesmarie C.	Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols	44
Lesmarie C.	Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment	99
Lhotska L.	Gender Ratio in Engineering Disciplines: Why Are There Differences?	35
Lhotska L.	Proposal of a Multi-Layer Data Model for Electronic Health Care Record	62
Li B.	The UK NIHR Health Technology Co-operative (HTC) in	94

Liauzu L.	Mental Health and Neurodevelopmental Disorders Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project	102
Lievens F.	Validation of the Telehealth Services Code of Practice for Europe	101
Lievens F.	Validation of the Telehealth Services Code of Practice for Europe	101
Lima MF.	Issuing Mammography Reports through Telemedicine and the Information Management System to Meet the Needs of the Public Health	45
Litmanen T.	Electronic Tools in Continuous Professional Development (eCPD) for Junior and Senior Finnish Physicians	27
Lobas V.	Education in Telemedicine and eHealth	21
Locat C.	Multidimensional Assessment of E- Health Projects Sustainability	54
Lopez LJR.	Integrated Model for Standardization of Electronic Clinical Records by Levels of Telehealth Center in Colombia	44
Lopez LJR.	Integration Model Applied To Healthcare Services	44
Lorens A.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Lundin K.	Preliminary Experience with Text-Message Reminder Service for Ambulatory Patients	61
Lundin K.	Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage	77
Lydia NU.	Perception of e-Health Services by Health Care Professionals (A Case Study of Federal Medical Centre, Imo State, Nigeria	60
Lygidakis C.	An Online Platform as a Tool for Surveys by Patient Associations	7
Lynen L.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
M.		
Macedo M.	Semantic Intelligence Interfaces for Ambient Assisted Living	66
Maia J.	1,000,000 Electrocardiograms by Distance: An Outstanding Milestone for Telehealth in Minas Gerais, Brazil	1
Maia JX.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Mák E.	Dietary Logging and Analysis for Tele-Care Using Harmony Rules	19
Malamateniou F,	An Android-Enabled Mobile Framework for Accessing Holistic Emergency Medical Services on the Cloud	6
Marckmann E.	Algorithm Evaluation: Identification of Electrocardiogram R Wave	5
Marcolino M.	1,000,000 Electrocardiograms by Distance: An Outstanding Milestone for Telehealth in Minas Gerais, Brazil	1
Marcolino M.	Tele dermatology: The Experience of a Telehealth Service	72

	in Brazil	
Marcolino M.	Telehealth to Provide Support for Healthcare Practitioners in Situations of Floods: A Brazilian Experience	76
Marcolino MS.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Marcus K.	Innovative AAL Solutions for Ageing Well	43
Marins A.	Mconf: A Webconference System Applied To E-Health	49
Markiewicz L.	Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database	73
Mars M.	The Digital Divide: Still a Reality?	86
Marttos A.	The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine	88
Masella N.	An Online Platform as a Tool for Surveys by Patient Associations	7
Massah S.	An Awareness System for Follow-Up Care after Breast Cancer Treatment	7
Massah S.	mHealth-Based Telecare for the People Affected by Disasters; Organization of Health-related Volunteer Help	51
Matavel A.	Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication	80
Mazzo A.	Telenursing as a Health Promotion Strategy	81
Mbogo Kiura S.	A Costing Model to Evaluate Economic Value of eHealth Applications: Cases of a Clinical and a Non-Clinical System	2
McCafferty D.	The Power and Economic Impact of Network Based Medical Device Aggregators	91
Meister S.	User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project	99
Melo MC.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Melo MC.	Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil	40
Melo MC.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Mendes I.	Effect of Presence and Distance Teaching Methods on Nurses' Knowledge about Pressure Ulcer	22
Mendes I.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42
Mendes I.	Telenursing as a Health Promotion Strategy	81
Mendes IA.	Knowledge of Nursing Professionals about Gloves Use	46
Mendes IA.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital	36
Mema V.	Teleophthalmology in Action: Ptosis Screening in Albania	81
Michoński J.	Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis	59
Milagres MG.	Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil	40
Milagres MG.	Issuing Mammography Reports through Telemedicine	45

	and the Information Management System to Meet the Needs of the Public Health	
Miścior T.	Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database	73
Mishra S.	Current Scenario and Future Trends of Indian Telemedicine	16
Mishra S.	Designing Model Applications for Medical Education using Collaborative Learning Technologies over NKN	17
Mitchell A.	User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project	99
Mohammadi N.	Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program	76
Mohbatali F.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Mondini R.	Telepharmacy - Pharmaceutical Care – An Assistance Project	82
Monrad Aas IH.	The Virtual Organization in Telemedicine: Problems and Solutions	95
Monreal VFD.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Monreal VRFD.	Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core’s Report in Mato Grosso Do Sul, Brazil	68
Monreal VRFD.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Monreal VRFD.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Monreal VRFD.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96
Monteiro A.	E-Learning Asynchronous Activities: Access and Interest Profile in Teledentistry	26
Monteiro A.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Monteiro A.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth Networks	89
Monteiro A.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Monteiro AK.	Effect of Presence and Distance Teaching Methods on Nurses’ Knowledge about Pressure Ulcer	22
Morais H.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Morais T.	Towards Applying Cloud Computing Technologies to Support PACS in the Public Hospital Routine	97
Moreira-Alkmim MB.	From a Research Project to a Regular Telehealth Service: Redefining Objectives and Strategies	34
Morita K.	Economics of e-Health: Measuring the Long-term Effect	21

	of Telecare	
Morita K.	New Framework of the Regional Medical System in the Aging Society: From a View of m-Health Economics	56
Morriss R.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
Mozgovoy V.	Efficiency of the National Telecardiology Network: Influence of Tele-ECG at Heart Death Rate	23
Mridha M.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24
Much M.	Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study	100
Murgia F.	Evaluation of Compliance to Telehomecare (THC) in a Group of Patients with Cystic Fibrosis (CF) in a Period of 2 Years	28
Muriel Bary RG.	Implementation of an Electronic Prescribing System: keys for a successful deployment	39
Murzi B.	Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations	79
Muteba E.	Optimization of Medical Decision: An Approach of Medical Decision Analysis	58
N.		
Nagliate P.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution	36
Nagliate P.	Knowledge of Nursing Professionals about Gloves Use	46
Nagy M.	Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?	53
Namli T.	A Personal Health Ecosystem: SharingCare	3
Narloch J.	Remote Quantitative Diagnostics of Radiographic Images of Osteoporotic Vertebral Fractures	63
Narloch J.	Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database	73
Nelson J.	Increasing Telehealth Knowledge in United States Veterans through Video Education	41
Nemekhee O.	E-Health and Telemedicine Priorities in Mongolia	24
Nemes M.	Dietary Logging and Analysis for Tele-Care Using Harmony Rules	19
Nemmiche A.	Objective Evaluation of Chronic Dysphonia Laryngeal Origin and Follow-Up of Their Treatments by the Implementation of Telemedical Device	57
Nenova M.	The Bioresonance Approaches for Telediagnosis and Telecare	85
Neto JM.	Effect of Presence and Distance Teaching Methods on Nurses' Knowledge about Pressure Ulcer	22
Neves DS.	From a Research Project to a Regular Telehealth Service: Redefining Objectives and Strategies	34
Neves J.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth	89

	Networks	
Neves J.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Neves VR.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Nogueira J.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Nogueira P.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution	36
Nogueira P.	Knowledge of Nursing Professionals about Gloves Use	46
Nordboe BV.	Four Existing EMCCs Working as one Virtual Emergency Operation Centre (VEOC)	33
North F.	Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?	20
North F.	Safety of Telephone Treatment Protocols in a Primary Care Practice	65
Nunes EA.	Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core's Report in Mato Grosso Do Sul, Brazil	68
Nunes EA.	Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil	74
Nunes EA.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Nunes EA.	Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil	75
Nwafuru S.	Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri	23
Nwako C.	Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri	23
Nwuke H.	Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri	23
Nwuke H.	Impact of Telewound Monitoring on the Quality of Life of Out-Patients in Federal Medical Centre, Owerri, Nigeria	38
O.		
Oberholzer M.	The Mongolian Model of Telemedicine and Telepathology: Concept and Practice	91
Obrycka A.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Qesteri O.	Albania's Five Year Journey towards an Integrated Telemedicine Program	5
Ogata Y.	The Medical ICT Utilization to Perinatal Telemedicine in Remote Areas	90
Ogini A.	Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri	23
Ogini A.	Impact of Telewound Monitoring on the Quality of Life of Out-Patients in Federal Medical Centre, Owerri, Nigeria	38
Oguntuase O.	A Journey towards Implementation of Innovative mHealth in Health Services	3

Oliveira F.	Monitoring Biosignals with Low Cost Wearable Sensors	53
Oliveira HW.	Validation of Photo-ECG for Remote ECG Analysis	101
Oliveira JA.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Oliveira M.	Speeding up the Content-Based Image Retrieval of Lung Nodules in the BigData Age	69
Oliveira M.	Towards Applying Cloud Computing Technologies to Support PACS in the Public Hospital Routine	97
Oliveira R.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Oliveira R.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Ontunya P.	A Costing Model to Evaluate Economic Value of eHealth Applications: Cases of a Clinical and a Non-Clinical System	2
Orlov O.	First Experience in Using Telemedical System Heart Wizard DELTA in Individual Prenosological Health Monitoring in Russia	32
Orlov O.	Space Medicine, Telemedical Ecology and Telemedicine: Prospects for Cooperation and Development	67
Oshafi M.	Albania's Five Year Journey towards an Integrated Telemedicine Program	5
Ouvradou G.	Multidimensional Assessment of E- Health Projects Sustainability	54
P.		
Pablo R.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Padilha J.	The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine	88
Palacios M.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Paludo C.	Telepharmacy - Pharmaceutical Care – An Assistance Project	82
Panasuriyasombat s.	Mobile Video Transmission System using IP Network Camera and MiFi	52
Papadaki C.	Mobile Personal Health Application for Empowering Diabetic Patients: The Case within EMPOWER Project	51
Papadopoulos Y.	Safety Analysis of a Remote Patient Monitoring System with a Guideline Based Decision Support	64
Parlette B.	Opportunities in Fund-Raising and Telemedical Program Development	58
Patja K.	Electronic Tools in Continuous Professional Development (eCPD) for Junior and Senior Finnish Physicians	27
Patten S.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Paula L.	Knowledge of Nursing Professionals about Gloves Use	46
Paula LB.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42

Pauli P.	Web-Based Psychosocial Care for Patients with Implantable Cardioverter Defibrillators	104
Paulo D.	E-Learning Asynchronous Activities: Access and Interest Profile in Teledentistry	26
Paunksnis A.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84
Pavlovich R.	Efficiency of the National Telecardiology Network: Influence of Tele-ECG at Heart Death Rate	23
Penna G.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Pérez D.	Actigraphy for Measuring Activity Levels to Support the Treatment of People with Depression in the Community	4
Pernas JC.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
Petermans J.	Gérontechnologies: State of the Art and Technology Validation	35
Petrlik M.	Arterial Plethysmography Project in a Remote Region: Survey Results from 52 Volunteers in Rural Brazil	10
Piaton-Breda G.	Multidimensional Assessment of E- Health Projects Sustainability	54
Pino M.	Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project	102
Pintér B.	Dietary Logging and Analysis for Tele-Care Using Harmony Rules	19
Ploessnig M.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Postaci S.	A Personal Health Ecosystem: SharingCare	3
Potůček J.	InspectLife – Platform for Providing Telecare and Telehealth	43
Pougatchev V.	First Experience in Using Telemedical System Heart Wizard DELTA in Individual Prenosological Health Monitoring in Russia	32
Pougatchev V.	Space Medicine, Telemedical Ecology and Telemedicine: Prospects for Cooperation and Development	67
Pruski C.	Analyzing the Evolution of Semantic Correspondences between SNOMED CT and ICD-9-CM	8
Puhakka A.	Telemedicine Service Measurably Reduces the Costs of Healthcare	80
Q.		
R.		
Rasmussen L.	Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage	77
Rasoli H.	Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program	76
Reiband HK.	Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage	77
Reis JCD.	Analyzing the Evolution of Semantic Correspondences between SNOMED CT and ICD-9-CM	8

Remy G.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
Rendeiro M.	Brazilian Teledentistry Network Experience	12
Rendeiro M.	E-Learning Asynchronous Activities: Access and Interest Profile in Teledentistry	26
Resende F.	Telehealth to Provide Support for Healthcare Practitioners in Situations of Floods: A Brazilian Experience	76
Reynaud-Delaitre C.	Analyzing the Evolution of Semantic Correspondences between SNOMED CT and ICD-9-CM	8
Reza S.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24
Ribeiro ALP.	Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil	71
Rievrs N.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Rocha M.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Rocha M.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth Networks	89
Rocha M.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Rocha MO.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Rodriguez Restrepo GF.	Impact on Learning and Medical Practice of an Online Community of Practice for Rural Physicians in a Developing Country	38
Roesler V.	Android® Based mHealth TeleECG System in Ibiraiaras, Brazil	8
Roesler V.	Arrhythmia and Ischemia Detection for a Sportsmen Monitoring System	9
Roesler V.	Mconf: A Webconference System Applied To E-Health	49
Roesler V.	Mobilicare: A Health Monitoring System for Chronic Patients	53
Rosário J.	Algorithm Evaluation: Identification of Electrocardiogram R Wave	5
Rosario J.	Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study	100
Rossetti N.	Towards Applying Cloud Computing Technologies to Support PACS in the Public Hospital Routine	97
Roze R.	Validation of the Telehealth Services Code of Practice for Europe	101
Rubió FP.	Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Russomano T.	Telepharmacy - Pharmaceutical Care – An Assistance	82

	Project	
Russomano T.	Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study	100
Russomano T.	Validation of Photo-ECG for Remote ECG Analysis	101
S.		
Sahiti F.	Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education	78
Saifi N.	Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program	76
Santos A.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Santos A.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Santos CD.	Issuing Mammography Reports through Telemedicine and the Information Management System to Meet the Needs of the Public Health	45
Santos J.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Santos M.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Santos M.	Telepharmacy - Pharmaceutical Care – An Assistance Project	82
Santos M.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth Networks	89
Santos M.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Santos R.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Santos R.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth Networks	89
Santos R.	The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks	90
Santos S.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Santos SF.	Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil	40
Santos W.	Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks	71
Santos W.	The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth	89

	Networks	
Saunders C.	Change Management – From Conception to Achieve True e-Health Integration?	14
Sarti T.	Automatic Triage of Electrocardiograms	10
Scheffler I.	Algorithm Evaluation: Identification of Electrocardiogram R Wave	5
Scheffler I.	Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study	100
Schilberg D.	Determination of Relevant First Aiders within a Volunteer Notification System	17
Schill K.	e-Health for Training Aboriginal Healthcare Workers	25
Schiltz A.	Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project	102
Schmidt MQ.	Automatic Triage of Electrocardiograms	10
Schmaus-Klughammer AE.	Improving Breast and Cervical Cancer Screening in Developing Countries Using Telemedicine	40
Schmuhl H.	The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways	87
Schneiders M-T.	Determination of Relevant First Aiders within a Volunteer Notification System	17
Schreier G.	Manufacturer Independent Interface for Cardiac Rhythm Disease Management	48
Schulz SM.	Web-Based Psychosocial Care for Patients with Implantable Cardioverter Defibrillators	104
Schwalbert AM.	Validation of Photo-ECG for Remote ECG Analysis	101
Scott RE.	Change Management – From Conception to Achieve True e-Health Integration?	14
Scott RE.	e-Health for Training Aboriginal Healthcare Workers	25
Scott RE.	Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0	41
Secci I.	A Clinical Diary Supporting Remote Monitoring of Chronic Diseases	1
Seded K.	Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication	80
Seixas CA.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42
Selkov A.	Initial and Advanced Training Course for Telemedical Experts (Conclusions)	42
Selkov A.	Social Aspects of a Telemedicine	67
Selkov A.	The Social Worker in TMC	93
Selkov A.	XX International Training Course “Modern Aspects of Telemedicine” (Conclusions)	106
Selkova E.	Initial and Advanced Training Course for Telemedical Experts (Conclusions)	42
Sereenen E.	E-Health and Telemedicine Priorities in Mongolia	24
Sharifi BK.	An Awareness System for Follow-Up Care after Breast Cancer Treatment	7
Sharifi BK.	mHealth-Based Telecare for the People Affected by Disasters; Organization of Health-related Volunteer Help	51
Sharvia S.	Safety Analysis of a Remote Patient Monitoring System	64

Silva B.	with a Guideline Based Decision Support Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective	61
Silva CTGMG.	Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department	75
Silva HM.	The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil	96
Silva NLC.	Issuing Mammography Reports through Telemedicine and the Information Management System to Meet the Needs of the Public Health	45
Silva V.	Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil	40
Single T.	The Challenges and Opportunities for Mainstreaming Telehealth - A UK insight	86
Siqueira E.	Android® Based mHealth TeleECG System in Ibiraiaras, Brazil	8
Siqueira EK.	Development of a Solution for Scientific Research in a Telecardiology Project in Brazil	18
Sitnik R.	Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis	59
Sitnik R.	Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database	73
Skarregaard D.	Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting	70
Skarzynski H.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Skarzynski P.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Skelton-Macedo MC.	Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy	47
Skelton-Macedo MC.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Sommer-Meyer C.	Clinical Protocols as a Measure for Quality Assurance: Experiences from a Large Teleconsultation Centre in Switzerland	14
Sørensen AM.	Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage	77
Sousa R.	Health Care Management with KeepCare	36
Sousa R.	Monitoring Biosignals with Low Cost Wearable Sensors	53
Souza C.	Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil	29
Souza C.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Souza M.	Arterial Plethysmography Project in a Remote Region: Survey Results from 52 Volunteers in Rural Brazil	10

Souza M.	Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy	47
Souza MC.	Knowledge of Nursing Professionals about Gloves Use	46
Souza VD Jnr.	Telenursing as a Health Promotion Strategy	81
Sparenberg A.	Development of a Solution for Scientific Research in a Telecardiology Project in Brazil	18
Spinewine A.	Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual	27
Spreeuwenberg M.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31
Spreeuwenberg M.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Sribuachum P.	Mobile Video Transmission System using IP Network Camera and MiFi	52
Srinivas MB.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24
Steinsøe U.	Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting	70
Stojakovic B.	Treatment for Mobbing Victims by Telepsychiatric Services	97
Stojakovic M.	Treatment for Mobbing Victims by Telepsychiatric Services	97
Stolyar V.	Initial and Advanced Training Course for Telemedical Experts (Conclusions)	42
Stolyar V.	XX International Training Course “Modern Aspects of Telemedicine” (Conclusions)	106
Stroebel R.	Safety of Telephone Treatment Protocols in a Primary Care Practice	65
Stroinski A.	Supporting Healthy Aging with Shared Self-Prevention E-Health Stations	69
Şufaru A.	Patient or Client? Who Decides in the Context of e-Health?	59
SugaTerada RS.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Suldsuren N.	Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication	80
Sultana N.	E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers	24
Szymił A.	TelMedHome System - Fast and Cheap Monitoring of the Patients with Cardiovascular Diseases	85
T.		
Taddei A.	Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations	79
Takahashi P.	Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?	20

Takahashi P.	Safety of Telephone Treatment Protocols in a Primary Care Practice	65
Takaluoma K.	Open Innovation in Health Care: The Role of ICT	57
Tammi N.	Telemedicine Service Measurably Reduces the Costs of Healthcare	80
Tandili A.	Teleophthalmology in Action: Ptosis Screening in Albania	81
Tange H.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31
Tange H.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Targarona EM.	Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution	102
Thomsen MV.	Preliminary Experience with Text-Message Reminder Service for Ambulatory Patients	61
Thornbury W.	mHealth & 2nd Generation Telemedicine: Making the Medical Home Mobile to Provide Care for World Populations	50
Timm R.	Development of a Solution for Scientific Research in a Telecardiology Project in Brazil	18
Tizatto L.	Mobilicare: A Health Monitoring System for Chronic Patients	53
Tognoli S.	Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution	36
Tognoli SH.	Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device	42
Toivonen L.	Telemedicine Service Measurably Reduces the Costs of Healthcare	80
Torres R.	Evaluation of the Virtual Course in Telehealth for Latin American Countries	30
Torres R.	The Experience of the Implementation of a Telehealth Resource Management Course in Brazil	89
Towers C.	BEIP – Happy, Healthy and at Home Medication Management via Video	11
Tsuji M.	Economics of e-Health: Measuring the Long-term Effect of Telecare	21
Tsuji M.	New Framework of the Regional Medical System in the Aging Society: From a View of m-Health Economics	56
Tulledge-Scheitel S.	Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?	20
Tyler M.	BEIP – Happy, Healthy and at Home Medication Management via Video	11
U.		
Ungerer R.	ePORTUGUÊSe - The Power of a Language Network	28
Urazimbetova S.	From Many to One: Analysis of Information Models for Patient Centric Telemedicine	34
V.		
Valdez C.	Validation of Photo-ECG for Remote ECG Analysis	101
Valius L.	Telescreening of Critical Eye Diseases in Rural Areas in Lithuania	84

Valstar M.	The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders	94
van Dyk L.	A Staged Reference Tool for Optimization of Telemedicine Services	4
VanderWerf M.	What does it take to Lead in Telehealth? A Vision for the Future	104
Varkey P.	Safety of Telephone Treatment Protocols in a Primary Care Practice	65
Vassányi I.	Dietary Logging and Analysis for Tele-Care Using Harmony Rules	19
Vassilacopoulos G.	An Android-Enabled Mobile Framework for Accessing Holistic Emergency Medical Services on the Cloud	6
Verwey R.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31
Verwey R.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Vido S	BEIP – Happy, Healthy and at Home Medication Management via Video	11
Vieira JNM.	Issuing Mammography Reports through Telemedicine and the Information Management System to Meet the Needs of the Public Health	45
Vladzmyrskyy A.	Education in Telemedicine and eHealth	21
Vladzmyrskyy A.	Efficiency of the National Telecardiology Network: Influence of Tele-ECG at Heart Death Rate	23
Vögele C.	An Online Platform as a Tool for Surveys by Patient Associations	7
von Overbeck J.	Clinical Protocols as a Measure for Quality Assurance: Experiences from a Large Teleconsultation Centre in Switzerland	14
Vukadinovic S.	Treatment for Mobbing Victims by Telepsychiatric Services	97
W.		
Walesiak K.	Organization, Workflow and Technical Issues of Teliagnostics for School Screening for Faulty Postures and Scoliosis	59
Walesiak K.	Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects	83
Ward W.	Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?	20
Wasowski A.	National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients	55
Weegen S.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31
Weegen S.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Weijden T.	Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care	31

Weijden T.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Wen CL.	The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health	93
Whitehouse D.	Benchmarking eHealth in the European Union: Observations Relating to Security and Data Protection	12
Williams L.	A Journey towards Implementation of Innovative mHealth in Health Services	3
Witte L.	Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity	98
Worters M.	Actigraphy for Measuring Activity Levels to Support the Treatment of People with Depression in the Community	4
X.		
Y.		
Yalçinkaya A.	A Personal Health Ecosystem: SharingCare	3
Z.		
Zafalon EJ.	ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG	37
Zniva R.	Web-Based Psychosocial Care for Patients with Implantable Cardioverter Defibrillators	104
Zolfo M.	Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings	30
Zolfo M.	The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices	92
Żukowska A.	Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis	59
Żukowska A.	Telepulseoximetry Assessment for Elderly Patients during Physical Therapy – Preliminary Study	83

Abstracts of

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1,000,000 Electrocardiograms by Distance: An Outstanding Milestone for Telehealth in Minas Gerais, Brazil

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Introduction Minas Gerais is the Brazilian state with the largest number of municipalities (853), with important social, cultural, economic, infra-structural and geographical contrasts. Within this context, telehealth has been used with the objective of improving healthcare for the population who live in isolated cities by supporting healthcare professionals in these areas. As Brazil is a developing country, emphasis is put on financially sound services and thus telehealth must be applied in a manner which optimizes its cost effectiveness. **Method** The Telehealth Network of Minas Gerais (TNMG) was established in 2006. It currently connects 660 cities in the State of Minas Gerais, providing teleconsultations for a broad range of specialties, analysis of electrocardiograms, Holter and ambulatory blood pressure monitoring, to support healthcare professionals, mainly in primary care. Financial support is provided by federal, state and municipal government. Using low-cost equipment and simple technology, TNMG has employed various strategies to overcome the barriers to telehealth use. **Results:** TNMG has already reached more than 1,000,000 electrocardiograms and 46,000 teleconsultations, promoting savings of 32.5M USD for an investment of 10M USD, an outstanding milestone for telehealth in Minas Gerais. Nowadays it is a regular health service in the State, integrated to the healthcare system. To achieve these results, technology and implementation and maintenance methodologies are constantly evaluated and improved. The main success factors were collaborative network, partnership government and academia, to meet real needs of users, to use simple and low-cost technology, adequate combination between virtual and personal process and economic sustainability. The success in primary care led it also to be adopted in secondary and emergency care. **Conclusion** The telehealth model developed to support primary healthcare in Minas Gerais has produced good clinical and economical results. As a consequence, it is now a regular health service in the State, integrated to the healthcare system. The model and technology characteristics permit the replication in other parts of the world.

Keywords: Telehealth, primary care, electrocardiography, teleconsultation

A Clinical Diary Supporting Remote Monitoring of Chronic Diseases

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Introduction Literature shows that telemonitoring effectiveness increases in systems always available to the patient. Mobile technology is particularly suitable for that purpose, but in order to be adopted it should be connected to measurement devices to automate acquisition whenever possible. **Materials and methods** We designed a clinical diary for smartphones/tablets, whose functionality isn't restricted to a specific domain, but is extensible to different clinical scenarios.

The application enforces modularity and consists of a central core managing a database and interfacing with ancillary services responsible for data acquisition and visualization. Services allow data to be acquired through manual input and wireless communication with devices. Once saved in the database data are accessed by visualization and charting services, and are also processed by a synchro service for sending them to the clinic, where they become available to clinicians through web applications. Results We implemented an Android application for acquiring, storing and synchronizing clinical data, whose main components can be extended to suit different domains. This is achieved by coding plugins which are attached to the central core, for defining new datatypes, or extend services in order to provide new ways for acquiring or managing data. The application has been tested in two different scenarios, involving remote monitoring of diabetic and nephropathic patients. We exploited Bluetooth connectivity writing plugins for automatically acquiring blood glucose values from a glucometer in the diabetes scenario, and for interfacing with a scale and blood pressure monitor in the nephropathic one. Plugins have also been written for representing and charting information through dedicated user interfaces, emulating the paper forms used by patients to communicate physiological parameters to the physician. Conclusions The application proved to be useful in speeding up the recording of clinical information and reducing errors. Mobile technology makes these operations unobtrusive and always available, bridging the gap between outpatients and the clinic and improving the provision of medical feedback.

Keywords: Mobile-Health, Telemonitoring, Chronic-diseases, Wireless

A Costing Model to Evaluate Economic Value of eHealth Applications: Cases of a Clinical and a Non-Clinical System

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We present in this paper results of a context-specific costing model to establish the economic value of eHealth applications. This is a tool for decision makers to decide on the establishment, funding and support to an eHealth system development project. Based on the model we present figures on costs return on investment and projections over time for two settings: a district level health-information reporting system and an integrated hospital management information system for a hospital in an urban setting. It is accepted that IT enhances healthcare delivery. Through contributions from technology experts, healthcare providers and funders, eHealth services and solutions can provide the appropriate responses in service delivery to achieve quality access and efficiency. Despite this consensus on benefits of eHealth, it is the case that many projects fail to be endorsed on the basis of the limited facts about the economic feasibility of the project. Healthcare providers and funders would like to be clear on the effects on the bottom line while the patients would like to be clear on the value. Methodology adopted has focused on review of literature on costing and evaluation of economic impacts both for general ICT systems and in health. Further we have used semi-structured interviews and held focused group discussions with district level health managers. We select two cases to demonstrate application of the model. The selection is based on the general classification of eHealth systems in terms of clinical information systems versus secondary usage non clinical systems. Our model uses the concept of Return on Investment to calculate the cost of a system providing parameters for monetary conversion of resulting benefits to stakeholders in an eHealth ecosystem. System features are correlated to the business value from stakeholder perspective to demonstrate the economic value of investing in the electronic system. These figures are extrapolated to investigate the changes over time. This model will be useful to health services providers (owners), healthcare givers and funding agencies in evaluating the feasibility and long-term profitability of a proposed initiative.

Keywords: Costing Model, eHealth Applications,

A Journey towards Implementation of Innovative mHealth in Health Services

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The UK ‘Collaboration for Leadership in Applied Health Research and Care’ projects (CLAHRCs) explore how implementation of constructive research findings in evidence based health services can be accomplished more quickly. At Med-e-tel 2012 there was discussion about how few clinicians are active in considering adoption of digital technology solutions. This case study presents some of the observations from a journey from identification of a promising mHealth intervention by health researchers to getting a clinical team to consider its use within a clinical setting for a research study. The South Yorkshire CLAHRC specifically has as one of its activities a remit to look at innovation of services using telehealth or mHealth for long term conditions. In 2010 a systematic approach to identify promising technologies was started, but a pragmatic approach of attending appropriate exhibitions identified a specific device as part of interventions tackling obesity. The manufacturer subsequently presented their technology to an open meeting of South Yorkshire researchers and clinicians. The majority of the audience adopted a critical approach to its accuracy of measurement of diet and exercise; in the end this was overcome by the device’s motivational and behaviour change potential. Random control trials conducted in Germany were published in 2010 and 2011 (the latter for reduction of HbA1c in type II diabetics). These were conducted by potentially biased researchers – they being connected with the intervention and technology invention. In 2012 a systematic review of RCTs of mHealth weight loss interventions showed support for further trials. During the period 2010-12 the authors multidisciplinary team involved in developing the trial has expanded to include nutritionists and clinical diabetologists. Despite the published evidence the latter currently ask for local evidence of acceptability and effectiveness. They need this before they could ask their clinical team to consider how the above identified technology could be used within their local clinical protocols and setting (i.e. for a pragmatic trial). This will be discussed in the paper and the presentation.

Keywords: clinical, adoption, novel, mHealth, evidence

A Personal Health Ecosystem: SharingCare

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This article describes a Personal Health Ecosystem, namely SharingCare, designed to address the adoption challenges of the Personal Health Record Systems which can be categorized as lack of effective computer mediated doctor-patient relationship; the increasing cost of integrating PHR systems with the existing healthcare systems, and the security and privacy concerns of the patients. To address these challenges SharingCare is designed as a Personal Health Ecosystem by providing a common personal health data model, a secure PHR storage account, and a central repository to be operated by Turkish Telekom.

Keywords: Personal Health Records, Mobile Health Applications, Wireless Medical Devices, Chronic Disease Management

A Staged Reference Tool for Optimization of Telemedicine Services

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Driven by advancements in technology, telemedicine adoption rates raised significantly since the mid-1990s. Eversince, there have been repeated calls for generalized, more systematic approaches to telemedicine implementation and assessment. Many worthy and useful attempts followed, for example Yellowlees' Seven Core Principles for the Successful Development of Telemedicine Services as well as several eHealth Readiness Frameworks. The latest and most comprehensive examples of such frameworks are the Model for Assessment of Telemedicine Applications - MAST as well as the Khoja-Durrani-Scott (KDS) Evaluation Framework.

In this presentation the strengths and weaknesses of these frameworks are briefly considered. Then a Telemedicine Service Maturity Model is presented which was designed with the purpose of addressing some of these weaknesses. The value of this tool is demonstrated by means of case studies from the public health sector of South Africa.

Actigraphy for Measuring Activity Levels to Support the Treatment of People with Depression in the Community

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The European FP7 Project Help4Mood aims to develop a platform to support the treatment of patients with depression, one of the main causes of disability worldwide. Depression affects mood, cognition and behaviour. In this paper, we present the design of the unobtrusive activity monitoring system used in Help4Mood and summarise the results of a first evaluation. Help4Mood is designed as a Personal Health System administered by a clinician that supports the treatment of people with depression at the home. The platform is structured around patient sessions and focused on monitoring symptoms and engaging the patient in activities based on Cognitive Behaviour Therapy. Help4Mood collects cognitive, psychomotor, and motor data through a Virtual Agent (VA) interface and the Personal Monitoring System (PMS). The Decision Support System controls sessions with the VA, analyses the data, and generates summary reports for discussion between patient and clinician. The PMS obtains objective data about activity patterns for three days per week through sensor devices, which are interconnected by a Wireless Sensor Network (WSN). Activity can be measured through a watch, a waistband clip, a keyring device, or a smartphone. The WSN has been designed to be unobtrusive, efficient and easy to use. The different sensors download their data automatically into a database, so that a technician for installation at home is not needed. Normally, data is synchronised automatically, but the data can also be downloaded manually just at the press of a button. Compression and transmission management techniques are used to reduce the energy consumption and to optimize the efficiency of the system. The information provided by the database interface not only includes activity data but also other statistics of use of the Help4Mood system. The activity monitoring system was tested with a total of ten people who had recovered from depression in Catalunya, Scotland and Romania. Each person used the system for a week. In addition to actigraphy data, we also collected diary information and qualitative data. Usability emerged as key to increasing stability and reliability of data collection.

Keywords: Personal Health System, Monitoring activity

AIO HD Camera System

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The presentation introduces AIO HD Camera System. This is the first HD medical camera in the world that has practice management software in the main unit of the camera.

AIO HD Camera System helps the expansion of telemedicine because it enables to have real time video conferences with other doctors. Other unique features of the AIO HD camera include the ability to directly print images through a printer or save images into a USB flash drive without using a computer. The presentation concludes with the comparison of AIO HD Camera and other medical cameras.

Albania's Five Year Journey towards an Integrated Telemedicine Program

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Background Before October 2007, few doctors and nurses in Albania had merely heard of telemedicine. Though the country has an interesting experience with what is probably the first known case of a movie on telemedicine. The movie, filmed in the early 80-ies, demonstrates a young family doctor operating on an intestinal obstruction case under the telephone guidance of his university professor. The movie is believed to be the dramatization of a true story. The surgery scene was the final presentation during the Second Intensive Balkan Seminar on Telemedicine and e-Health that took place in Tirana during October 2007.

The purpose of showing it was to demonstrate to the participants that telemedicine can happen in a variety of forms and actually saves lives.

Methodology A rapid cascade of events took place following the seminar. The International Virtual e-Hospital Foundation (IVeH) received support from USAID Albania to conduct an assessment of the country's technical and human capacity to host a telemedicine and e-health program. The report was delivered on September 2008 and it was immediately followed by a Memorandum of Understanding that was signed between the Albanian Minister of Health and the President of IVeH. On September 2009, USAID Albania provided financial support for the Integrated Telemedicine and e-Health Program of Albania. At its full development, the program would have both national telemedicine centers and 11 regional ones, covering the whole country. In parallel, the US Army pledged to renovate the premises where these telemedicine centers would be located. On September 2011, the National Telemedicine Center of Albania was officially opened and USAID renewed their support for another 2 year program.

Results As of end 2012, the Integrated Telemedicine and e-Health Program of Albania is composed of 3 tertiary telemedicine centers and six regional ones. It offers teleconsultation, distance CME and electronic library. The state-of-the-art technology is now supporting programs like teletrauma, telestroke, teleophthalmology and development plans include other medical disciplines. Throughout the program, IVeH is guided by its well known IBOT approach.

Keywords: telemedicine, IVeH, IBOT, USAID, Albania

Algorithm Evaluation: Identification of Electrocardiogram R Wave

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Introduction: The electrocardiogram (ECG) reflects the electrical activity of the heart. The correct identification of ECG QRS complex wave forms, especially R waves, by vital signs monitors and defibrillators is essential for the correct evaluation of a wide range of cardiovascular conditions. The development of software to identify the QRS has been the subject of several studies in the last 30 years. **Objective:** To evaluate the sensitivity of algorithms used by multiparametric cardiac monitors with wi-fi capacity for the identification of the R wave in ECGs. **Methodology:** The study consisted of 3 phases: (1) Preparation: obtaining ECGs from a cardiac arrhythmias database to standardize testing and the selection of monitors for the comparative study. (2) Tests – monitors were connected to an AD/DA converter module. Two types of monitor output signals were used: the synchronization of the cardioverter/defibrillators and the speaker excitation signal. (3) Data analysis – the MIT Database software was used for analyses of the files. Three parameters were established to identify the R wave peak: window size of the R wave evaluation; delay of output signal; voltage corresponding to speaker excitation. **Results:** Analysis of 43 ECG recordings demonstrated a 99.01% sensitivity in the identification of the R wave (Positive-Positives) by the Lifetouch-10 monitor, with an error of 1.87% being observed between False-Positives and False-Negatives. The other monitors evaluated showed lower sensitivity and a higher error. **Conclusion:** The LIFEMED Lifetouch-10 monitor presented a satisfactory performance of its algorithm when compared to the other evaluated monitors. Future studies will evaluate data transmission via wi-fi.

Keywords: Electrocardiogram, Lifetouch-10, Algorithm, Lifetouch-10, Wi-Fi

An Android-Enabled Mobile Framework for Accessing Holistic Emergency Medical Services on the Cloud

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Emergency medical services (EMS) have been one of the most important gateways into the health care system. They constitute cross-organizational services, involving ambulance agencies and hospital emergency departments (ED), performing a wide range of pre- and in-hospital emergency care activities. A holistic approach to emergency care requires coupling among multiple health and social care organizations (e.g. EMS agencies, hospitals, non-governmental organizations, social care institutions) which presents the need for documentation and the distribution of integrated information for coordinated work, driven by organizational properties and sociocultural constraints. Furthermore, it requires blending emergency and social care activities to address all aspects of patient care needs. Conceptually, these activities can be interconnected to form socially-enhanced emergency healthcare processes within and between the participating organizations (i.e. ambulance agencies and hospitals), thus comprising a virtual holistic emergency healthcare enterprise. Thus, in developing an information system that supports EMS processes, it is essential to place particular emphasis on supporting individual process activities as well as on the collaboration and coordination needs among them. The development of an EMS system as a cloud computing application which interfaces with a PHR and can be accessed by almost any device enables immediate access to critical medical information concerning an emergency case either by authorized ambulance center personnel on site of incident and during patient transfer to a hospital or by emergency department personnel allowing them to check patient medical histories, patient medication history, patient allergies and much more to ensure that the treatment provided is the safest and most effective choice for the patient. This paper is concerned with the development of an EMS system and focuses on providing ubiquitous access to integrated patient information stored and exchanged during an EMS workflow execution through familiar environments such as Google's Android.

Keywords: Android, cloud computing, emergency care

An Awareness System for Follow-Up Care after Breast Cancer Treatment

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Usually, people suffering from major diseases like cancer and their families are primarily reluctant to accept the presence of the disease and they prefer to think that what is happening is not real. Similarly, after the treatment, they want the illness to be over as soon as possible and try to forget about it. Although such spirits can be effective in the treatment process, it should be noted that careful pursuing of the follow-up steps for permanent recovery is more effective than merely forgetting it. On the other hand, treating breast cancer takes a long time and due to a variety of therapeutic activities, more physicians are involved in the treatment process. Since patient information is not usually recorded in a standard and uniform format, the therapeutic activities are likely to fall apart and some important information may be forgotten or not recorded in a patient's file properly. In some cases, new scientific findings change or modify the treatment processes. Sometimes, it is necessary to redo some previously done tests with newer techniques so as to prescribe newer medications accordingly. So, according to what was mentioned above, in this research, we are designing and executing a system which reminds the patients about further treatment steps and required tests by using communication means such as telephone call, text and email. This will encourage registered patients to visit physicians and pursue follow-up steps to reach full recovery. This project is carried out in two stages. First, some of the people diagnosed with diseases who are willing to take part in this program are registered in person. Then, their medical records are received and, according to the kind of disease and its severity, further steps are reminded. In this step, physicians and the residents with relevant expertise analyze the data manually. (This part of the project has already started and we are in the process of recruiting cooperating volunteer physicians.) In the next step, by using the experience gained in the pilot phase, a web-based software application will be developed and these services will be offered in higher speed, and larger scope and size.

Keywords: Awareness System, Follow-up, Breast Cancer

An Online Platform as a Tool for Surveys by Patient Associations

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Background Patients are increasingly interested in sharing their experiences and learning about their conditions, their prevention and treatments, and are more frequently turning into advocates. The connectivity and the wide availability of a large amount of data have been shown to support this development enabling patients to play an active role in healthcare. The “Lumos!” platform is a web-based solution that has been designed to facilitate teams of researchers conducting multicentre studies, especially in countries and contexts with low research capacity. Nevertheless, it can be modified and tailored as a tool for research studies carried-out by patient organisations.

Aim The aim of this study is to assess the feasibility of an online platform as a tool for anonymous surveys conducted by a patient organisation.

Methods A questionnaire is currently being distributed in the Region of Emilia Romagna (Italy) by the Regional Federation of Diabetics with the aim to study the needs of patients that use self-checkup devices. This observational study has been designed online with the use of the “Lumos!”

platform, which enables the creation of the questionnaire with adjustable fields and variables, using the expertise of the participants and the creation of reports. Furthermore, a URL and a QR code linking to the questionnaire is being published on Social Networks and websites inviting people to participate in the study. Several data will be retrieved from the logs of the platform, such as the time required to complete a questionnaire by a patient, the number and types of errors, and the percentage of completed items. These variables will be analysed taking into account the demographic characteristics of the patients.

Conclusions By studying the indicators of the implementation and the characteristics of the participants, it will be possible to optimise participation rates and achieve higher engagement from the participants in the future. We expect that with the help of the online platform, patient associations will be supported in their quest to conduct surveys and, as a secondary outcome, they will empower their members to play a more active role in healthcare.

Keywords: patient engagement, epidemiology, public health

Analyzing the Evolution of Semantic Correspondences between SNOMED CT and ICD-9-CM

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The growing quantity of the produced medical data requires a new generation of tools to exploit this data to reduce costs and optimize the quality of care. To this end, automatic interpretation of data, information retrieval and sharing are of utmost importance and implement Knowledge Organization Systems (KOS) like ontologies, thesaurus or classification schemas to automatize the treatment of digital information. However, the size and characteristics of the domain makes impossible the definition of a single KOS able to represent the entire medical knowledge. This is why managers of information systems are forced to use a combination of KOS in order to optimize the coverage (e.g. use ICD for classifying diseases or SNOMED CT for clinical knowledge). This is done through the definition of semantic correspondences (or mappings) between KOS. It consists in defining the semantic relation (e.g. equivalence) that exists between elements (e.g. concepts) belonging to different KOS. But due to the dynamic aspect of the medical knowledge, KOS have to follow this evolution and are likely to be modified over time, which can potentially invalidate previously created mappings. In consequence, modifications occurring in KOS must be propagated to mappings in order to keep the underlying information systems consistent over time. We focus on the mapping maintenance problem. The aim is to propose a formal framework able to propose new semantic correspondences between concepts of medical KOS when those evolve. The goal is to automatize as much as possible the maintenance process reducing the validation time as well as the quantity of errors. We have analyzed the evolution of the mappings between several KOS in order to identify correlation between the way KOS evolve and the impact of this evolution on the behavior of mappings. In this paper we report on this aspect. We have investigated 4 successive versions of SNOMED CT, 2 versions of ICD-9-CM and 4 versions of their associate set of official mappings. Our study highlights such correlation between the way KOS evolve, and especially the type of change affecting elements (e.g. split or merge of concepts), and the way mappings behave

Keywords: SNOMED CT, ICD-9-CM, mappings evolution

Android® Based mHealth TeleECG System in Ibiraiaras, Brazil

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Introduction: Providing qualified health services on a global basis is a major goal as defined by World Health Organization (WHO). eHealth and telemedicine innovative elements, like new mHealth tools, can favor the assistance of remote and underserved populations. This paper describes the implementation of Android® based teleECG method in a remote Brazilian village. **Objectives:** 1. To validate a TeleECG method based on Android® platform established in a remote Brazilian region; 2. To present pilot project results from a 3-month survey period. **Methods:** The system was installed in the ECG room of the Ibiraiaras' regional hospital, a 7000 inhabitants village located in the state of Rio Grande do Sul (RS). Training sessions for the involved professionals were held both in the Institute of Cardiology of Rio Grande do Sul (ICFUC) and locally in Ibiraiaras city, which is about 240 km away. During a 3-month pilot period (between September and December 2012), the ECG exams were performed locally in the remote city and sent through the Internet to a server in the company I9access Technology. Two cardiologists from the ICFUC eHealth Centre - using Android® tablet PCs and mobile phones - analyzed and sent back the final interpretation in a period of up to 24 hours. The data was stored in a private cloud, being reachable through a web browser or any Android device version 3.2 or latest. **Results:** A total of 131 ECGs were analyzed: 81 (61,83%) exams were normal, 13 (10%) were analyzed as chronic cases, whereas 4 (3%) were compatible with acute cardiac diseases. No major technical issues were reported during the pilot phase. **Discussion:** The evolution of telecommunication and electronics has brought the availability of data transmission via mobile devices - through wireless technology - paving the way for the expansion of telehealth for homecare assistance and remote monitoring of patients' vital parameters. This portable technology - "mHealth standard" - can prove an invaluable technological contribution towards the implementation of regional teleECG networks, with major impact in areas where there is a significant shortage of cardiology services.

Keywords: TeleECG, Android, mHealth, Cardiology

Arrhythmia and Ischemia Detection for a Sportsmen Monitoring System

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This work presents a sportsperson telemonitoring system that uses automatic heart disease detection methods in electrocardiograms allied with mobile technologies to prevent cardiac complications and leave the physical exercise safer. The practice of moderate and rigorous physical exercise is recommended to promote the people's health, but in some cases this kind of practice can be dangerous. The risk of cardiac complications related to physical exercises increases in sedentary individuals and in individuals who do not exercise regularly. Usually, these complications occur in individuals with anatomical or hereditary predisposition to heart disease. This work aims to detect cardiac arrhythmias and ischemic heart disease in people who practice moderate or rigorous physical exercises. Its use is recommended in three moments: (1) When screening athletes and non-athletes prior to their participation in physical activities. (2) When monitoring people during physical activity. (3) When monitoring patients in cardiovascular rehabilitation programs. The monitored individual wears a portable electrocardiograph and a mobile device with the application that receives the ECG signal, analyses it and detects arrhythmias and ischemia in the received signal. The application also allows transmitting the data and results through the web, reaching remote doctors and health specialists if needed. The

methods used in the system were evaluated using databases of arrhythmias and ischemia of the MIT/BIH. In this evaluation the methods achieved 99.83% of accuracy to detect arrhythmias and 98.36% of accuracy to detect ischemia. The system was also tested in people who exercise regularly and sedentary people, during physical activity, obtaining satisfactory results. A practical demonstration of the system will be performed during the presentation when an electrocardiogram can be performed in real time with the aid of a portable electrocardiograph and a smartphone. The ECG signal will be processed by smartphone and will be sent to the server in Brazil with the resulting analysis. In Brazil, the medical center can verify if the received data are normal.

Keywords: telemonitoring, signal processing, ischemia, arrhythmia

Arterial Plethysmography Project in a Remote Region: Survey Results from 52 Volunteers in Rural Brazil

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Introduction: Early stage diagnosis of lower limbs arterial obstructive disease, obtained through non-invasive strategies have been proposed as a means of diagnosing incipient vascular occlusion. In 2012, as a result of a bi-national partnership, an arterial plethysmography survey was conducted at “Centro de Saúde da Reserva” (CSR) - a rural hospital located in the city of São Lourenço do Sul - in southern Brazil. Objectives: 1. To analyze the applicability of a non-invasive diagnostic strategy for the early detection of arterial flow reduction in a rural population of Brazil; 2. To introduce an innovative telemedicine platform allowing data storage and transmission for specialized second opinion. Methods: The plethysmography method was developed at the headquarters of Advanced Medical Solutions Inc. (AMS), in Brno, Czech Republic. In August 2012, the system was installed at the CSR, and a 3-month pilot project period was conducted. The method consists of two cuffs positioning and inflation during up to 120 seconds, as applied in both inferior limbs. Arterial wave flow data are collected, transmitted through the web and remotely analyzed by an angiologist. Results. The plethysmography pilot project was implemented in the ambulatory sector of the CSR, which included a 5-day period of capacity building carried out under the supervision of an AMS expert. After that, during 2 months, a total of 52 volunteers with a mean age of 50 years - 24 male/28 female - were selected. Plethysmography method risk factors - evidenced as “abnormal peripheral perfusion indicators, e.g. arterial capacity and altered arterial waves” - were detected in 18 volunteers (34,61%). Discussion: Early detection of reduced arterial flow evidenced through a plethysmography method can help preventing vascular diseases and avoiding physical incapacity due to premature loss of lower limbs. That can be particularly valuable when applied to underserved areas of the globe, where specialized vascular diagnostic facilities are unavailable. Individual and social benefits are expected to be confirmed through long term evaluation of this strategy.

Keywords: Plethysmography, Arterial Stenosis, Rural Telemedicine

Automatic Triage of Electrocardiograms

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A telecardiology service produces a significant number of ECG records to be analyzed remotely by cardiologists. Normally, most of the records are from patients with a normal ECG pattern. On the other hand, a significant number of records are from patients suffering from any cardiovascular disease. Nevertheless, the selection and distribution of the ECGs to the cardiologists respect the arrival time of each record, except when the ECG is classified as urgent. As a consequence, normal and abnormal ECGs take the same time to be analyzed by the cardiologist, and the normal ECGs delay the time response of abnormal ones. In order to face this problem, a suitable solution would be an ECG triage according to a priority level, prioritizing pathological ECGs. Since the response time is critical, an automatic triage system for ECGs is required. The main challenge for the automatic triage system is to perform ECG classification with high sensibility and positive predictivity. This way, it is possible to reduce the response time for the abnormal ECGs, improving efficiency and quality of the telecardiology service. In such context, this work proposes an automatic triage system based on the automatic classification of the ECG records. Our system carries out a multilevel analysis of ECG which is composed of the following steps: QRS peak detection; ECG waveform segmentation; rule based system for ECG classification; ECG triage according to the ECG pattern and the priority level. A predefined set of ECG patterns can be assigned to a priority level by the specialist. Aiming at testing the algorithms, we have done some experiments using standard ECG databases containing abnormal ECGs. Our results in terms of sensibility and positive predictivity are presented for the following ECG patterns: QRS peak detection; premature ventricular contraction beats; ST elevation; left ventricular hypertrophy; atrial fibrillation. On the sequel of these experiments, we are planning to apply the automatic triage system in a telecardiology service and evaluate its performance in terms of time response.

Keywords: telecardiology; electrocardiogram; classification; triage

BEIP – Happy, Healthy and at Home Medication Management via Video

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RDNS (www.rdns.com.au) is one of the largest home nursing and home care providers in Australia. Founded as a charity in 1885 employing one nurse, RDNS has now grown into a national organisation delivering services to people in their own home throughout Australia. Medication management is a core activity for RDNS with 25% of all client visits including such assistance as part of the RDNS service package. Like most of the developed world, Australia is confronting the dual challenge of an ageing population and an ageing workforce. The growth in demand for home based healthcare services is outstripping the growth in supply of healthcare providers. To compound this problem for organizations like RDNS whose traditional service model has been built on face to face visits to clients by nurses, urban congestion is constantly increasing the amount of time spent travelling to clients. In addition, publicly funded health and home care expenditure is under increasing pressure and the need to contain operating costs is acute. To address these challenges and prepare RDNS for the future, RDNS has been trialling a new service model whereby medication management visits are delivered to clients by our registered nurses via a videoconferencing unit installed in the client's home. The trial will have been running for ten months by April of 2013. The trial has been funded by the Victorian State Government and RDNS and key partners – Telstra, Health Tech (representing the Intel/GE technology RDNS is using) and La Trobe University. The trial has research ethics approval and will be formally evaluated by La Trobe University. Given the current rollout throughout Australia of the National Broadband Network, this trial is a timely exploration of what the future may hold in terms of the potential for 'remote nursing' in an urban environment. The RDNS clients in the trial are typically receiving a combination of face to face and video visits. The main challenges for

RDNS in this trial are testing the clinical efficacy of this service model and identifying whether a business model exists which will sustain this mode of service and allow it to be 'mainstreamed'.

Keywords: Community care, telehealth, videoconferencing, nursing

Benchmarking eHealth in the European Union: Observations Relating to Security and Data Protection

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Introduction and background: eHealth is of increasing importance to the European Union. Surveying eHealth use is recognised to be of crucial importance [1]. During 2010, European acute hospitals were questioned about their use of a wide variety of eHealth applications in a benchmarking study commissioned by the European Commission [1]. Hospitals in the EU27 as well as Croatia, Iceland, and Norway were covered by the survey, and its initial findings were published in mid-2011. General findings: Some 1200 hospital chief information officers and medical directors were interviewed. Among the general findings are insights into: the availability of electronic medical applications (gathered from chief information officers), and ICT use, investment priorities, and barriers to implementation including during implementation (from medical directors). In more detail, the survey looked at the way in which the current state of electronic data exchange, and data protection and security is handled in Europe's hospitals. Focus on security and data protection: 2012 was a year of growing preoccupation with regard to ICT-based critical infrastructures [2], and during which the European Union declared its intention to reform its data protection legislation. As a result, this paper re-examines the original survey findings to focus on: security and data protection, enterprise archive strategies, long-term data storage, data recovery, and the security and privacy of electronic patient medical data. The key strengths of the hospital systems in these areas, their gaps, and the characteristics of hospitals in a number of example Member States are explored. Future considerations for European hospitals in relation to security and data protection are highlighted. References [1] European Commission (2011). eHealth Benchmarking III. SMART 2009/0022. Final Report. Deloitte & Ipsos Belgium. 13th April 2011. Brussels [2] M.D. Hercheui, D. Whitehouse, W.J. McIver Jnr. & J. Phalamohlaka (editors). (2012). ICT Critical Infrastructures and Society. HCC10 2012. IFIP AICT 386. IFIP International Federation for Information Processing. Springer-Verlag: Heidelberg and Berlin

Keywords: data protection, eHealth, security, hospitals

Brazilian Teledentistry Network Experience

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Brazil has adopted e-health as a national policy applied to telecare and teleducation since 2006. The multiple strategies include mainly the Brazilian Telehealth Program, Open University of the Unified National Health System (UNA SUS) and University Telemedicine Network (RUTE). In this context it was created the Teledentistry National Network (RNTO) in 2011

(www.telessaudebrasil.org.br). Its goal is to share and exchange well succeeded experiences of telehealth applied to teledentistry, nationally and abroad. Two relevant RNTO initiatives are to be mentioned. One of them is the e-learning course destined to institutions interested in developing Teledentistry Centers. It is divided in three modules: 1. How to implement and manage a Teledentistry Center; 2. How to train and stimulate professors to use more widely information and communication technology (TICs) in the teaching-learning process; 3. How to support a service of teleconsultancies and Formative Second Opinion for health professionals. The second initiative, as part of RUTE, is the creation of a Special Interest Group (SIG) in Teledentistry. It represents one out of more than 40 SIGs already at work, in different specialties mostly in Medicine. The Teledentistry SIG is a virtual space in which education and research institutions from all over the country get together, discuss, share their experience and learn how to better work as an effectively connected network. The RNTO is run by the Brazilian Association of Dental Education (ABENO) and by the Teledentistry Center of the Faculty of Dentistry of University of Sao Paulo (NTO-FOUSP) , in partnership with the Telehealth Centers of the University of the State of Rio de Janeiro (UERJ), Federal University of Rio Grande do Sul (UFRGS) and the State Secretary of Health at the State of Mato Grosso do Sul (SES-MS). The project is supported by the Ministry of Health with the cooperation by Panamerican Health Organization (PAHO). The two initiatives are articulated and producing effects on the function, strengthen and extention of the RNTO. Is is also contributing for the improvement of telecare at SUS, research and education in undergraduate and post graduate

Keywords: telehealth, teledentistry, e-learning, social networks

CANSCREEN - Early Stage Cancer Screening Based On Analysis of Blood Proteins, Evaluated by Special Cluster Analysis

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Objective of rational clinical and biochemical cancer diagnostics is an early diagnosis or screening. During the last twenty, clinical research focuses on finding tumour markers (followed by commercial production of such diagnosing kits), which are mainly specific organ enzymes and tumour antigens. On the other hand, non specific protein (proteins of acute phase), which are found with different methods (polarography, electrophoresis of proteins) are lately criticised just like less valid "markers of fifties". Scientific experimental studies, however, lately confirm significant changes in occurrence of several protein components in blood serum, examined before macroscopic finding of an induced tumour. This validates results of clinical monitoring concerning changes in alpha-1-acid glycoprotein , alpha-1-antitrypsin, haptoglobin or in alfa, beta and gama globulins. The main principle of CANSCREEN is a complex analysis of blood proteins and target is low-cost method for cancer screening. As measurement methods were chosen electrophoresis and coulometry After several years of clinical testing, a new expert system was developed. The idea of this system is an application of cluster analysis of measured parameters, first of all of different blood proteins. Unique feature of proposed medical expert system is given by optimal algorithm on the most effective classification of unknown object (patient) to one of the known diagnosis. As a difference to the present available classifying programs, like BMDP, SPSS , STAGRAPHICS, this one provides better efficiency of diagnosis classification presented near the boundary of diagnosis. In following months clinical tests of this system will start in cooperation with Motol Hospital of Charles University Prague and Regional Hospital Ústí n.L. The next step od CANSCREEN is an application of THz tomography for patients which are after biochemical screening detected as probably with some kind of tumour. THz imaging will be a valuable imaging technique in the future, particularly for cancer diagnosis. For cluster analysis a

WINDOWS software package BioAnalyst was developed with support of governmental research agency GACR.

Keywords: cancer, screening, glycoproteins, cluster analysis

Change Management – From Conception to Achieve True e-Health Integration?

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Context Within the e-health literature there are many publications on architecture, infrastructure, implementation, change management, evaluation, sustainability, and integration. More recent publications regarding e-Health Strategy have also arisen. Each offers differing perspective and recommendations, and we still have not resolved how best to ensconce e-health within existing health systems. **Methods** In this paper we first present a model of the sequential steps necessary to achieve full e-health integration. We then critically evaluate the latest scientific evidence of models of change management regarding implementation and integration of e-health into health systems, applying this to the sequential steps identified. In particular we use Morgan's organizational metaphors to highlight the beliefs and assumptions regarding how change is enacted, who is responsible for the change, and the guiding principles for that change. By doing so we identify the mechanisms by which change is accomplished and the limitations of each metaphor. As the predominate metaphors at play, this work identifies the metaphors of organizations as machines, organizations as political systems, and organizations as organisms. **Benefits** The goal is to seek insight regarding the best evidence of the sequence of steps needed to ensure successful implementation and integration of e-health into health systems, and how these steps can best be successfully introduced using change management models. It is unlikely any single model will offer all the needed answers, but clarity around the sequence of steps, and application of different change management metaphors and models at each step, is arising. We conclude with implications for theory and practice.

Keywords: e-Health, Change Management, Integration, Strategy

Clinical Protocols as a Measure for Quality Assurance: Experiences from a Large Teleconsultation Centre in Switzerland

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In recent years, telephone consultation and triage have increasingly been used as a means for healthcare delivery. This procedure has been described as “the process where calls from people with a healthcare problem are received, assessed and managed by giving advice or by referral to a more appropriate service”. One main motive for introducing such services was to help callers to self-manage their health problems and to reduce unnecessary demands on other healthcare services. Quality assurance is crucial for safety and effectiveness of teleconsultations. The Swiss Centre for Telemedicine Medgate is one of the largest teleconsultation centres in Europe. More than half of the insured persons in Switzerland have access to our services. This poster will describe how we use clinical protocols as a means for quality assurance in our centre. According to our definition, a clinical protocol is a guidance derived from clinical practice guidelines containing concrete criteria for individual medical decisions. We will address the available evidence specific to the telemedicine setting and will describe how we adopt other existing guidelines to our setting. One major issue is to find a balance between safety concerns and

efficiency (as measured by the rate of patients not in need for further face-to-face consultations). In summary, we will present a case study of evidence-based protocol development and implementation in a setting other than usual face-to-face medicine.

Keywords: telemedicine, teleconsultation, quality assurance, evidence, safety.

Connecting Nurses Program

S. Coumel

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“The Connecting Nurses Initiative” www.connecting-nurses.com (in Partnership with the Foundation Millennium2015). Nurses are at the fore front of patient care in a wide range of areas, and their role is key in chronic disease management and patient education. Their role will expand and become even more important in the future. The Connecting Nurses program is an initiative for nurses supported by sanofi and developed in collaboration with Nurses Federations (The Nurse Practitioner Healthcare Foundation (NPHF), International Council of Nurses (ICN), the Secrétariat International Des Infirmières et Infirmiers de l'Espace Francophone (SIDIIEF), and the Association Française pour le Développement de l'Education Thérapeutique (AFDET)). Connecting Nurses intends to provide a web 2.0 collaborative platforms for nurses from all around the world to share their ideas, advice and innovations. This worldwide on line nursing recognition program’s ambition is to help turn caring ideas into reality: nurses from all countries are invited to showcase on line their creativity and their care solutions/practice innovations. Two Connecting Nurses communities are on line: Care Challenge & Information Shareapy. Care Challenge (www.care-challenge.com) has been created to celebrate the important role the nursing community plays in healthcare provision around the world, while addressing the challenges which arise within modern healthcare systems. Information Shareapy (www.connecting-nurses.com) a nursing community focused on patient education for nurses to share high quality, reputable health weblinks to their patients. The goal of ‘Information Shareapy’ is to help nurses:

- Connect with other nurses and healthcare professionals
- Be more efficient during their interactions with patients
- Keep updated with the ever changing world of health information on the web

The Connecting Nurses program brings a range of other benefits to nurses such as improving recognition of the nursing community by giving them a stronger voice. Indeed, it will support dialogue within the nursing community by creating networking opportunities at a national and international level. Helping to share knowledge on nursing techniques will enhance education, research and practice as well as the care of patients.

Recently, Connecting Nurses and the Foundation Millennium2025 have agreed to partner and launch the WeObservatory an innovative Digital Inclusion Platform dedicated to women’s global health challenges. The overall objective of the WeObservatory is to serve as a unique Resource Center on Telemedicine for nurses, to promote women empowerment through the access and use of advanced technologies combined with innovative integrated collaborative leadership programs. About Sanofi: Sanofi, a global and diversified healthcare leader, discovers, develops and distributes therapeutic solutions focused on patients’ needs. Sanofi has core strengths in the field of healthcare with seven growth platforms: diabetes solutions, human vaccines, innovative drugs, rare diseases, consumer healthcare, emerging markets and animal health. Sanofi is listed in Paris (EURONEXT: SAN) and in New York (NYSE: SNY).

Cost Effective Fake Drug Alarming & Surveillance Support System Based on mHealth

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Fake drugs is one of the hurdle to improve health care facilities in developing countries that lead to increase death rate and medical disabilities particularly in birth cases and during disaster like earth quick, flood and tsunami etc. Different steps were taken in past to overcome this issue but not getting successful results from them. In current era of technology, use of information communication technologies in pharmaceutical sector (drugs informatics) will be a hope in this regard. In this study, we will going to design a system based on mHealth that gives better and cost effective solution for the developing world. The proposed system works 24/7 support which is easily accessible by patients, hospitals and health practitioners. The system provides on demand verification of drugs buying from pharmacy with their manufacturing and expiry details. In case of verification failure, system will have ability to generate warning messages to the concern pharmaceutical industry as well to health ministry department to take necessary action against it. The system will going to be develop by using different open source tools including frontline sms, php, java and mysql, because these open source tool have low hardware specification requirement that helps in the development of low cost fake drug alarming and surveillance system.

Keywords: mhealth, drug serveillance, drug informatics

Current Scenario and Future Trends of Indian Telemedicine

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It has been an enriching experience to see the growth of Indian Telemedicine since late nineties. From technology development to proof of concepts to pilot studies it has now been part of institutional activity around the country. During all these years many programs failed to sustain and have gone to oblivion. The success of the remaining programs can mainly be attributed to the continued perseverance of program leaders. Federal structure of governance has given the liberty to state governments to develop telemedicine programs for the state. Though there is no national e-health and telemedicine policy, need has taken priority to define the business for healthcare access for a weak health delivery system. Lack of a well structured national health insurance system and inadequate public funded health system the private health service providers have taken an upper hand and almost sixty percent of population depend on it. Mobile telephony has crossed 900 million and is continuously growing though the same growth is not happening in Broad band wireless internet. mhealth is not so well adopted due to lack of business models. Entrepreneurship is just in infancy. Investors are watching for the suitable opportunity to take the plunge. National fiber back bone infrastructure using USOF is coming up in a big way raising the hope for last mile access with WiMax to deliver BB internet enabled public services to every villagers at their door step. Rural Telehealth service delivery will be reality for may enthusiastic researchers to test their models built on low cost concepts. Mobile telephone service providers are tying up with corporate hospitals to develop business models though none has matured till date. Another set of entrepreneurs working on third party service provider concept tying up with medical specialist and technology vendors. Most of the medical professionals at large are still averse to technology so are the public. There is a need of awareness and advocacy. National policy has to come up though government spending has already started. The phenomenal growth in bandwidth provision for ICT enabled medical education can be attributed to NKN.

Keywords: Indian Telemedicine, National Knowledge Network

Design and Implementation of an Expert System for the Diagnosis of Blood Diseases in FMC Medical Laboratory – Owerri Imo – State, Nigeria

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The project Design and implementation of an Expert system for the diagnosis of blood diseases in FMC Medical Laboratory in Owerri will be used as a pilot laboratory to showcase the implementation of an Expert system.

Blood diseases incidents have been on the increase in our society and it is becoming increasingly difficult for doctors to give the right diagnosis to these many diseases. The main objective of this work is to develop an automated mechanism for blood disease diagnosis based on laboratory test result and subsequently recommend the right prescription for the treatment. This expert system will aid physicians to make intelligent decisions on lives. The methodology employed is structured system analysis and design methodology (SSADM). It is expected that the software should be able to capture patient records, store them, diagnose a patient of a specific blood diseases from test results and store the records for future reference.

Designing Model Applications for Medical Education using Collaborative Learning Technologies over NKN

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National Knowledge Network (NKN) is a state-of-the-art multi-gigabit pan-India network for providing a unified high speed network backbone for all knowledge related institutions in the country funded by Department of Science and Technology, Government of India. Capability of NKN to handle high speed bandwidth with low latency thus supports lots of medical applications where bandwidth is the key factor for implementation. Telepresence technology in telemedicine has brought sharing of surgical skill transfer to outside world through interactive videoconferencing/ real time streaming/Video on Demand (VOD). Entire video from the operation theatre was streamed to public as well as local network for simultaneous viewing from various parts of hospitals through existing hospital HIS Network. The shortage of medical professors at various level of hospitals (medical colleges, tertiary level hospitals etc) of developing countries can be filled by conducting continuous medical education (CME), workshops and Surgical skill sharing by adopting advance information and communication technologies, High Definition (HD) Displays & capture devices. Various workplaces like Integrated Operation Theatre for sharing live surgical operations, Surgical Telepresence room with large digital wall with HD videoconferencing & streaming technologies for conducting surgical skill workshops, Integrated Lecture theatre for sharing live surgery with conference participants, Telepresence Suites for live interactive sessions with multimedia data transfer with remote participants & Knowledge management suites for surgical skill capture, edit and archival for future reference needs to be designed keeping in mind the need of the doctors.

Keywords: Telemedicine, Tele-education, National Knowledge Network

Determination of Relevant First Aiders within a Volunteer Notification System

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During a Sudden Cardiac Arrest (SCA), an untreated time interval of only a few minutes usually means the victims' death. While professional emergency medical services (EMS) are working on

shortening the time needed for arriving on scene, there are parameters that limit potential performance increases regarding this topic; e.g. current traffic, the travel distance and the delay between an incoming emergency call and the march out of the professional helpers. Given this premise, it is necessary to find alternative ways for providing immediate first aid treatment to victims suffering SCA. One approach is the implementation of a Volunteer Notification System (VNS) – integrating laypersons and medically trained volunteers into the EMS, by notifying those potential helpers who are, at the time of incident, close to the scene. Whereas the term ‘close’ is suitable for describing the general concept of a VNS, a social valuable system implementation requires an algorithm that analyses and determines which volunteers are to be alarmed. False or unnecessary notifications might have a negative effect on the user acceptance or system performance, whereas not alarming potential helpers who are actually close enough can greatly decrease the system’s value. While the actual distance is an important parameter to be considered, it does not necessarily determine the time of arrival at the scene. Due to possible obstacles, the beeline calculation obviously does not offer a suitable background for estimating the traveling time; but even considering up-to-date roadmap material in order to calculate the shortest way does not provide sufficient information without some assumptions. Thus, the type of movement, the physical performance of a volunteer and the traffic situation directly influence those calculations. Furthermore, limiting the relevant decision parameters to merely distance seems inadequate and secondary criteria apply; e.g. medical expertise, knowledge of the area or general engagement. In addition to giving a brief overview to the “EMuRgency” project, this paper will introduce the main criteria for determining the relevant volunteers within an ongoing emergency scenario.

Keywords: Notification-System, Emergency-Medical-Services, Telemedicine, First-Aid

Development of a Solution for Scientific Research in a Telecardiology Project in Brazil

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Introduction: Since 2010, a telecardiology e-Health program, coordinated by the e-Health Centre of ICFUC-RS, is being established in the state of Rio Grande do Sul (RS), in Brazil, including 31 remote hospitals. The system allows remote hospitals to send cardiologic exams to the eHealth Centre of ICFUC-RS, and to receive the diagnosis immediately, on a 24/7 mode. The method uses a proprietary software for the management of cardiologic exams, including the storage of patient’s files. IT Technicians of the eHealth Centre developed and implemented new software that allows to better manage and to recover the stored data. Objectives: This study aims to: 1. Report the development and implementation of a software that can allow a better management of epidemiological data. 2. Provide relevant statistical information to both health authorities and remote institutions. Methods: The Tele-ECG software uses a Database (DB) in Firebird® format. However, it does not provide statistical information that would supply the eHealth Centre needs. The new software was developed between April-June 2012 by the IT Technicians and with the support of cardiologists of the eHealth Centre. The new interface connects the old DB to a new one. Microsoft Visual Basic 6 was used for its creation, allowing cardiologists to fill in relevant clinical data, as well as recording final exams interpretation. All captured information is stored into the new DB. Results: From July 01st to December 12th, 2012, a total of 10528 exams were analyzed and recorded into the new DB. These data are filtered according to the request, and monthly delivered to both public health authorities and remote institutions. Conclusions: The development of the solution made by the local IT technicians of the eHealth Centre was an important key for the management and the progress of the Project. The epidemiological data collection in public health is critical to the improvement of care to the population.

Keywords: telemedicine, telecardiology, database, software

Development of Telemedical Practice Platform: Application to Telesurveillance of Cardio-Respirographic Function

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Telemedicine has been known for several decades in practice of medicine, in order to improve quality of the care and the assumption of responsibility of the patients. Telemedicine is defined as the application of information and communication technologies (ICT) in the practice of medicine. We propose in this paper to study and develop a human interface device dedicated to Tele monitoring of the cardiorespiratory function. This device can be operated with different communication Protocols and will be a technical equipment able to record on the patient in real time and simultaneously three physiological signals representative respectively of the electrical activity of the heart pump (ECG), mechanical activity of ventilation pump (PTG) and respiratory activity of pulmonary interchange (PPG) and transfer these signals through the Tele medical networks view Telemedical application as data archiving at ends of Telemonitoring, IDM preventives, Tele weaning of artificial ventilation at home etc.

Keywords: Telemedicine, Telesurveillance, Microcontrolor, biomedical sensors.

Dietary Logging and Analysis for Tele-Care Using Harmony Rules

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An important task of personalized lifestyle counseling is dietary menu planning and analysis. The paper describes the architecture and results produced by an automated dietary menu generator MenuGene, applied now in a diabetes home monitoring project. Our solution is intended to support, not to substitute the human dietary expert. Computer-aided menu planning is a traditionally hard problem since it is characterized by i) a very large search space and ii) hard-to-formalize expert dietary knowledge on the harmony assessment of a menu. For the first problem i.e. search satisfying numerical constraints, we apply multi-level, multi-objective genetic algorithms that calculate the fitness of candidate solutions using personalized target values of various nutrients. The objectives for the menu planning process are obtained from personal medical data, entered manually or measured by sensors of the tele-care system. Another source of information is the aim of the patient like “losing weight” and the user’s daily dietary log (essentially a smart phone application) which can be analyzed for food composition and completeness. Then we apply general nutritional guidelines to compute the personalized numerical constraints at different levels. An example constraint is the daily minimum, optimum and maximum value for carbohydrate content. For the assessment of harmony, we defined dietary concept sets, and use a simple mechanism for enforcing harmony rules over them. The rules are used to score candidate solutions e.g. a daily menu, and the score is combined with the numerical fitness of the solutions at different levels (dish, meal, daily menu). Rules assign a positive or negative score to a co-occurrence pattern of two or more sets. Positive scores mean recommended patterns, like “muesli and any drink for breakfast”, and are used during menu generation, while negative scores mean detrimental combinations, like “beer and water-melon in the same meal”, and are used for the assessment of the user’s log. The MenuGene system is currently applied in a clinical trial, in which it will support the nutritional logging, analysis and blood sugar management of patients with diabetes.

Keywords: menu-planning, nutrition counseling, genetic algorithms

Does Home Blood Pressure Telemonitoring Increase the Number of Diabetes Patients at Goal Blood Pressure?

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OBJECTIVE To compare the effectiveness of home blood pressure telemonitoring versus home blood pressure measurement to achieve goal blood pressure in diabetic primary care patients. **DESIGN** Single site randomized controlled trial. **SETTING** Academic primary care internal medicine practice, Rochester, MN, USA, 2011- 2012. **PARTICIPANTS** 50 primary care diabetic patients with a history of uncontrolled hypertension (BP > 140/90) were randomized to either home blood pressure telemonitoring (intervention, n=25) or home blood pressure measurement (control, n=25). **INTERVENTION** Nurse care manager support (all participants), including periodic review of blood pressure, clinical assessment, and facilitated access to primary care providers. The intervention group received a commercially available home blood pressure telemonitoring device capable of real time data relay to a nurse care manager, and care-modifying instruction display in response to their blood pressure measurements. The control group received a home blood pressure monitoring device and usual care. Study visits and blood pressure measurements occurred at baseline, 3 months, and 6 months. **MAIN OUTCOME MEASURES** The primary outcome was goal blood pressure achieved at 6 months. The secondary outcome was change in blood pressure. **RESULTS** At 6 month follow-up, goal blood pressure was achieved in 68% of the intervention group (13 at goal of 19 total) versus 64% in the control group (16 at goal of 25 total); relative risk of intervention achieving goal blood pressure 1.07 (95% CI 0.70 to 1.63, p=0.99). The intervention group achieved a mean change in systolic BP of -6 mm Hg (95% CI -12.4 to 0.4 mm Hg, p=0.06) and diastolic BP of -0.6 mm Hg (-9.1 to 7.9 mm Hg, p=0.9) versus systolic BP +2.7 mm Hg (-11.1 to 5.6 mm Hg, p= 0.5) and diastolic BP +1.7 mm Hg (-2.2 to 5.7 mm Hg, p=0.4) in the control group. **CONCLUSIONS** Diabetic patients in primary care setting with a nurse care manager who received home blood pressure telemonitoring were not more likely to achieve goal blood pressure or lower mean blood pressure compared with patients receiving home blood pressure measurement without telemonitoring.

Keywords: telemonitoring, hypertension, blood pressure, diabetes

ECG Platform: From First Idea to User Driven Development

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Our goal was to offer storing, sharing and analyzing of ECG records over internet to individuals, cardiologists and engineers. We planned it to be Web2 account based internet application. ECG recordings are difficult to read even for general practitioner medical doctor and therefore because they can not be read they are useless for general population. On the other hand, quality ECG measuring devices are nowadays easy to use USB external PC devices. To bridge the problem, the ecg platform is developed to enable analyses of home recorded signals. The project regards electro-cardiac (ECG) signal in non-critical situations. The platform is used by concerned individuals, sportiest who want to have regular cardiac supervision, house of old people-records reduce necessity of visits to cardiologists, individuals who want to store their ECG data for future disease development analyses and medical doctors who use it on the location. At first stage of the project the personal data protection is achieved by assuring anonymity at each stage of the process. The Account serves to store two databases: an ECG recordings database and a database of analysis Reports. The ECG recording is uploaded from home PC ECG device onto account. The Reports are created by pay-per-click (ppc) analytical functions (AddF). For example, to analyze the ECG recording one clicks suitable AddF's analyses. They are easy to understand and

with clear instructions for action. AddFs' could link to a software product (offered by different providers) or a person-cardiologist who analyses the recording. Special Accounts are created for MD Cardiologist (personal cardiologist of the user-patient), who gains instant access into his patients' records with automatic warnings.

Keywords: ECG, Health, Internet-platform, Customer Development

Economics of e-Health: Measuring the Long-term Effect of Telecare

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Telecare is aimed at monitoring the health of the elderly or patients at home via the transmission of health-related data, and is thereby expected to enhance users' health. We previously confirmed that telecare reduced the medical expenditures of users in Nishi-aizu Town, Fukushima Prefecture, Japan, which in 1994 introduced Japan's longest-running telecare. The population of about 8,000 resides in 3,000 households, with a percentage of elderly over 65 years old in 2010 of 41.0%. Telecare used in this town allows patients to measure their health data, send the data to the town's health center, review the data at home, and receive advice from public nurses. This paper aims to examine the long-term effect of telecare (e-Health) in Nishi-aizu Town, Japan from 2002-2010, by comparing medical expenditures and days needed for treatment between two groups, namely users (treatment) and non-users (control) of the system based on the receipt data issued by National Health Insurance. Our previous papers used data of five years from 2002 and 2006, while this paper expands the period of analysis to four more years with respect to respondents who used in the previous analysis. The number of samples for 9 years is reduced sharply, namely 90 of users and 118 of non-users. Using a rigorous statistical method such as system GMM, this paper demonstrates that for all diseases, the relationship between telecare and days spent for treatment and medical expenditures are not found significant, whereas for chronic disease such as heart diseases, strokes, hypertension, and diabetes, long use of telecare reduced days spent for treatment and medical expenditures of chronic diseases by 4.2 days and 64,944 JPY, respectively. In particular, users who have been suffering hypertension reduced significantly two outcomes, which is due to that hypertension is a main disease in this town. Thus, telecare has a possibility to yield the rather larger effect to the users in the longer period.

Keywords: Telecare, medical expenditures, chronic diseases

Education in Telemedicine and eHealth

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Telemedicine and eHealth applications are the integral part of health care systems. Tendencies of a few last years shows dramatically increasing of interest and needs for professional education in field of telemedicine and eHealth. According these trends the postgraduate course "eManagement (Telemedicine and Health ICTs) in Health Care System" was founded in Donetsk National Medical University two years ago. This is 72 academic hours course for health care managers, medical doctors and IT staff. For the course introduction we had developed methodological materials (program, guidelines, test bank etc), also as special handbook. This handbook was approved by Ministry of Health Service of Ukraine, thus the first national telemedicine handbook was published. The course is include: lectures (internal and via videoconferences), practical

seminars, and work-shops. Approximately, 10-40% of the course materials could be studied via distance education system. This approach allows to give additional skills and knowledge. Subjects of the course are: legal and ethical aspects of the telemedicine and eHealth, theory and clinical implementation of the telemedicine, eHealth infrastructure and applications, medical information systems and EHRs, eManagement in health care, medical Internet and social media, eLearning etc. Preparation of the thesis “Plan of Telemedicine Implementation in ... Hospital” is a key part of final exam. There are 7 courses spent during last 2 years, and about 120 students from 9 regions of Ukraine were graduated. 36% of the students were from tertiary regional hospitals and university clinics, 38% - from municipal hospitals, 16% - from rural hospitals, 10% - from emergency hospitals (ambulance cars service). There are health care managers - 60%, medical doctors – 32%, IT staff – 8%. We found that our experience with organisation of professional education in field of telemedicine and eHealth was very successful.

Keywords: eHealth, Telemedicine, Learning, Handbook, Education

Effect of Presence and Distance Teaching Methods on Nurses' Knowledge about Pressure Ulcer

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There is no consensus about what kind of education would be better to increase nurses' knowledge of Pressure Ulcer (PU)(1,2,3). Thus, this study aimed to verify the effect of the presence and distance teaching methods on knowledge of nurses about PU. The experimental research with posttest control group was performed at a large-sized public hospital in Brazil, from January to April 2012. The sample of 43 nurses was randomly divided into Control Group (n=20), who had in-presence classes, and Experimental Group (n=23), with distance learning. For data collection, Pieper and Moot's (1995) knowledge test was applied. The mean score on the knowledge test for the in-presence learning participants was 34.0 (sd=3.3) and for participants of the distance learning was 36.2 (sd=2.7). The mean difference between groups was statistically significant (p=0.019). The effect of distance education methods on nurses' knowledge of PU was higher than the one of presence teaching. Distance Education (DE) seems to be an effective strategy for lifelong learning as it is practical, interactive and enable nurses who are in clinical practice to decide on the best time and place to access the content(4). Improving nurses' knowledge of PU is essential to promote nursing interventions pertinent to the Guidelines for prevention and treatment of PU. [1] COSTA J.B.; PERES, H.H.C.; ROGENSKI, N.M.B.; BAPTISTA, C.M.C. An educational proposal to teach a pressure ulcer management course online to students and nursing professionals. *Acta Paul Enferm*, v.22, n.5, p.607-11, 2009. [2] COX, J.R.; WYNEN, S; COX, E.V.J; ROCHE, S; WYNEN, E.V. The effects of various instructional methods on retention of knowledge about pressure ulcer among critical care and medical-surgical nurses. *The journal of continuing education in nursing*,v.42, n.2, p.71-8, fev, 2011. [3] JONES, M.L. E-learning in wound care: developing pressure ulcer prevention education. *Br J Nurs*, v.16, n.15, p. 26-31, 2007. [4] HORIUCHI, S.; YAJU, Y.; KOYO, M.; SAKYO, Y.; NAKAYAMA, K. Evaluation of a web-based graduate continuing nursing education program in Japan: A randomized controlled trial. *Nurse Education Today*, v.29, p.140-149, 2009.

Keywords: Pressure ulcer, Distance Education, Nursing.

Effectiveness of mHealth Services in the Use of Pictogram to Telemonitor Hypertensive Patients in F.M.C, Owerri

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Background: Low adherence to medication is among the primary causes of unsatisfactory control of blood pressure, which leads to complications like chronic renal disease, angina, congestive heart failure and stroke. There is need for patient-centered approach that will enhance cognition of medication instruction by pictorial representation of prescription instruction and ancillary label and ensure adequate adherence by telemonitoring the medication usage. The aim of this study is to assess the effectiveness of mHealth services in the use of pictogram to telemonitor patients' adherence to medication. **Method:** 126 participants of age, 20 and above was drawn from consultant's out-patient section of federal medical centre, Owerri; 5 declined and 6 has no constant mobile phone line and were excluded. 115 patients, who consented to informed consent, were divided into 58 patients for telemonitoring group while 57 patients were non-telemonitored group (Control). Both groups were adequately counselled with oral and pictogram. The telemonitored group was called 5 times in accordance to the duration of their medication which must be at least 2 months. Various medications taken by one patient were clearly differentiated by color coding. The colour codes were tagged on the printed pictorial instruction via-a-vis the drug container, of similar colour. The Telemonitoring patient medication chart was divided into the demographical and medication data. The adherence level was assessed by morisky et al., method and pill counting method. **Results:** The effect of education on the adherence indicated those in post-secondary cadre in both groups adhered more than those without education at all. Those within the age bracket of 60 and above adhered more than others with those in the range of 30-39 being the least. Effect on both diastolic and systolic blood pressures showed that the telemonitored 84.5% adherence and 63.8% (n=37) had their blood pressure $\leq 130/80$ while control 70.8% adherence 43.9% (n=25) had their blood pressure $\leq 130/80$. **Conclusion:** When there is enhanced understanding of prescription instruction and telemonitoring of medication; adherence level is improved.

Keywords: telemonitoring, mHealth, pictogram, adherence, medication

Efficiency of the National Telecardiology Network: Influence of Tele-ECG at Heart Death Rate

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Modern telecardiology consist from a few components: tele-ECG, teleconsultations with transmission of diagnostic data (sound via teleauscultation, ultrasound etc), home (individual) telecare, biotelemetry etc. During the last 7 years more than 180 thousands teleconsultations were lead in frame of this national tele-ECG network. **Aim:** to find efficiency of the tele-ECG network "Telecard" and influence to death rate. **Material and methods.** For each administrative reigion of Ukraine (n=25) have been collected the next statistical data (for period 2006-2011): absolute number of tele-ECG consultations per year, absolute number of dead owing to diseases of heart and blood vessels per year (data from State Statistical Service of Ukraine and Institute of Demography and Social Researches). Data were compared, for determination of reliability of differences the nonparametric Mann-Whitney U test is used. **Results and Discussion.** After comparison we found that serious decreasing of death rate and serious increasing of tele-ECG number took place in 29,0% (7) regions; decreasing of death rate at background of medium number of tele-ECG at same level - 25,0% (6); decreasing of death rate at background of absence of tele-ECG - 17,0% (4); insignificant fluctuations of death rate and tele-ECG levels - 12,5% (3);

increase or insignificant fluctuations of death rate against increase of number of teleconsultations - 12,5% (3); increasing of death rate at background of absence of tele-ECG – 4% (1). We compare two groups of regions: I (n=5) – decreasing of death rates at background of very intensive tele-ECG, II (n=4) – decreasing of death rates at background of absence of tele-ECG. In I group the average percent of annual decrease in quantity of death made 5,0+3,4%, in II group - 3,7+2,5%. This differences are statistically reliable according U-test (p=0,0012). Conclusion. No doubt that a hundreds factors have influence to the heart death rate, but we can be sure that tele-ECG is one of the most important factors, which has serious and positive influence. The intensive tele-ECG statistically reliable allows to decrease level of death owing heart and vessels desiases.

Keywords: telecardiology, tele-ECG, efficiency, death rate

E-Health and Telemedicine Priorities in Mongolia

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The purpose of this study is to identify current environment of the telemedicine and e-health, information flow within the health sector, its connectivity, telemedicine initiatives, health facility based information system and workforce capability and attitude on existed e-health applications and determine priorities to better management health information system in Mongolia. The study was used document and desk reviews, questionnaires with 362 users from 105 health care facilities. The data were analyzed using by qualitative and quantitative methods. The study was shown that supportive environment for telemedicine and e-health is getting started, vertical health information flow and H-info-2 set up within the health sector. In the clinical information system, most health care facilities installed in use CPOE software and a few numbers use LIS, DIS and RIS. However there is no integration of e-health software and lack of its capacity. It is required a modern integrated health information system in the health sector.

Keywords: eHealth, telemedicine, health information system

E-Health Centres in Developing Countries to Manage Illnesses through Patient Education and Empowerment of Rural Health Workers

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In the developing countries, although the vast majority of the people are living in the rural areas, the qualified medical doctors are not available there. Health care workers and paramedics are largely responsible for the rural medical care. Medical mishaps due to wrong diagnosis and inappropriate medication have been causing serious suffering and increasing health care costs that are largely preventable. In order to improve health care facilities and achieve health equity and patient safety, we together with the local partners are using innovative, locally appropriate ICT tools to address some of the health problems of the poor women and school girls in rural areas. We focus on to improve the rural health workers' quality and performance by creating enabling environment such as access to: a) reliable, robust and cost effective medical devices b) proper education and training to use the diagnostic equipment and c) connectivity to the medical experts

for disease prevention and disease treatment advice and d) health education to teach women and school girls how to prevent and treat health problems which routinely afflict them and their families.

We have deployed smart and affordable diagnostic devices integrated with the communication systems and have developed care services nearest to the homes that have the capacity to diagnose the common chronic illnesses, formulate in consultation with distant specialists a Home-care Plan, follow-up care, identify secondary risks and make referrals. We have also started to organize Health Clubs to create scope for collective approach for management of these illnesses through patient education and empowerment. Female health worker are visiting women at the homes with: i) relevant and user-friendly health care content to educate to manage health, ii) portable and affordable diagnostic devices for quality diagnosis, and iii) communication platform to connect the health workers and patients with medical experts for advice. We find this model of e-Health programme to be appropriate for Bangladesh, India and believe to be suitable for other resource-constrained countries. The rural women are regularly taking the services from the e-Health centre. They find great satisfaction from the face to face video-consultation with the medical experts. They appreciate the just in time, cost-effective and quality treatment without any need for travelling. This has greatly reduced the earlier errors due to wrong diagnosis or wrong medication or too much medication for a too long time. However, some village doctors feel threatened to see this e-Health services becoming popular, and are propagating against the e-Health services. Due to cultural reasons, the rural women freely accept the female paramedics to discuss their personal health problems, and they are available and affordable. Therefore, it is important to recruit and empower the rural female health workers for providing health information for better prevention, diagnosis and treatment. It is urgent to promote health and thereby strengthen capacity of the vulnerable population for their socioeconomic development. Integration of smart, affordable medical devices with ICT tools can play a vital role in rapidly improving the rural health care situations and improve patient safety.

Keywords: rural e-Health centres, empowerment of health workers, quality diagnosis and treatment advice, Patient education, Patient safety

e-Health for Training Aboriginal Healthcare Workers

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Context The Aboriginal population in Canada has significantly worse health outcomes than the non-Aboriginal population. This difference is the result of oppression and marginalization resulting in unequal access to resources, education, inadequate housing etc. and the discord between the traditional biomedical model and Aboriginal values and circumstance. There is also a disjoint in cultural unity and identity among many Aboriginal groups, which results in low feelings of self-worth among individuals, compounds the impact of social determinants of health, and contributes to poor health outcomes. The difference in health outcomes relative to non-Aboriginal populations is also in part attributed to the lack of appropriate medical services available in rural and remote communities. **Objectives** The objective of this study is to assess the potential use of e-Health (e-learning and telemedicine) to address the current health needs of aboriginal healthcare workers. **Methods** A literature review is being conducted to assess the use of telemedicine and e-learning to train, and to maintain the knowledge and skill set of, aboriginal healthcare workers. A preliminary review of the literature indicates there is little information to be found on the topic, requiring review of both grey literature and peer reviewed literature. Following the literature review, interviews will be held with key informants who are actively involved in Aboriginal healthcare (found through, e.g., the Assembly of First Nations). The

interviews will assess the interest in, and potential usefulness of, telemedicine and e-learning among Aboriginal healthcare workers.

Benefits This study provides the opportunity to examine if there are technological and educational alternatives to involve the aboriginal community in aboriginal healthcare, particular in situ training for rural and remote communities. It will assess if there is interest in e-learning opportunities, which may ultimately enable the aboriginal community to take an active role in reforming the Canadian healthcare system to better address their needs.

Keywords: e-Health, Aboriginal, Healthcare Workers, Rural

eHealth Patient-Centered Solutions: New Opportunities and Strategies in the Pharmaceutical Industry

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As Sanofi continues its evolution towards more comprehensive healthcare partnership, eHealth Solutions will play an increasingly important role to enhance stakeholder engagement and patient outcomes. This evolution will require a more intimate appreciation of patient needs, care pathways and technology enablers. Sanofi has developed and prototype-tested a number of eHealth Solutions, a few of which will be previewed in this discussion.

e-Health: Junior Doctor's Perspective and Future Implications

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Even if technology is mature and e-health is a technical reality, its diffusion is more a socio-technical and socio-cultural issue: e-Health needs to be accepted and used by stakeholders. Therefore one of the most urgent areas to examine and develop is the usability of the e-Health approach and applications. Junior doctors are naturally considered computer literate and some even computer natives. These generations have met technologies earlier during their learning process and medical studies and they have been already considered an important variable in the development of functional e-health systems. Since we are interested in the opinions of JD's (Junior Doctors) on different e-health aspects we decided to perform a short analysis of literature present online and to propose a first online survey to EJD (European Junior Doctors).

E-Learning Asynchronous Activities: Access and Interest Profile in Teledentistry

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In 2007, The Brazilian Ministry of Health established The Brazilian Telehealth Program aiming at developing actions of support towards health assistance and, mainly towards permanent education of health care providers. The Program has been structured in the form of a chain of partner institutions named Brazil Telehealth Network, within the establishment of Telehealth University Centers, Telehealth Points and Telehealth Advanced Points at the Service Units. In order to fulfill such demands, we have organized and deployed some synchronous learning actions in 2011 - monthly seminars, two-hour interactive sessions on points of interest for the professionals involved with Primary Health Care, physicians and public health. These seminars are recorded and they can be accessed afterwards. The aim of this research is not only to evaluate the

participation of Dentists in the asynchronous activity, but also to get to know their profile of interest. A retrospective study was undertaken, using available information on Moodle Platform, organized on an Excel spreadsheet and analysed according to the percentage frequency. In 2011, there were 726 accesses, 41% in the afternoon shift and 44% in the night shift. In 2012, there were 2,149 accesses in order to watch the recorded seminars, involving a total increase of 296%. 38% were registered during the afternoon shift, while 58% were registered during the night shift, respectively. In relation to the professional interests concerning the topics, 70% of the accesses were towards the topics on Public Health, while 30% were related to Clinical issues. Based on these outcomes, we may conclude that the learning activities are not only essential, but also very well accepted, taking into consideration the increase in the participation rate. In relation to the time of access, it was observed that they are primarily in the afternoon, the time when the Health Units are at off-peak hours and also at night, when it can be accessed from home. When! it comes to the profile of interest, the topics related to Public Health were the most accessed ones, which show interest and the necessity of enhance knowledge.

Keywords: Telehealth; Dentistry; Permanent Education

Electronic Prescribing System: Opportunity to Improve the Adaptations of Drug Prescriptions towards the Formulary Manual

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Background The Formulary Manual (FM) is essential to the management of the drugs in a hospital. An adaptation of the chronic treatment of the patients to FM is often necessary, with the aim of continuity of the care and the costs control. **Purpose** The implementation of an Electronic Prescribing System (EPS) is an opportunity to develop new tools to facilitate and optimize the adaptations towards the FM in EPS and to analyze the prevalence of the prescriptions of non-formulary drugs. **Method** a) Realization of switch tables (ST) to the prescription into the FM - 14 priority pharmacological classes (including 7 into the cardiovascular class): revision of the FM, realization and validation of ST (March-November 2011) - 40 withdrawn drug specialities of the FM; 4 added - 7 tables integrated in EPS (including 5 into the cardiovascular class). b) The EPS presents to the prescriber the statute Formulary (F) / non- Formulary (NF) of the drug, a hospital note including a ST, if realized, substitutions (blocking) or proposals (not blocking). c) Contact pharmacist - prescriber for the remaining NF prescriptions. **Results** Prevalence of NF prescriptions analyses: Statement of the percentage of the regulations NF (NF/F + NF); monthly and yearly follow-ups, parallel to the deployment of EPS (4 wards in 2009 – 16 wards in 2011): annual percentage of NF: 8,87% (2009, 4 wards with EPS), 4,57% (2010, 11 wards with EPS) and 3,69% (2011, 16 wards with EPS). **Conclusion** The implementation of an EPS is an opportunity to re-examine the tools facilitating the adaptation of the treatment towards the FM. The realization of ST is well accepted by the prescribers and it contributes to the observed reduction in the percentage of NF prescriptions. This project is the result of many multidisciplinary collaborations.

Keywords: Electronic prescribing system, formulary manual

Electronic Tools in Continuous Professional Development (eCPD) for Junior and Senior Finnish Physicians

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Pro Medico, The Association for Medical Continuous Professional Development in Finland,

In Finland, Continuous Professional Development, CPD is voluntary with an ethical and legal obligation for physicians. Taitoni-platform is a personal web tool designed to manage and support physician CPD with both formal and informal learning activities. The tool is accompanied and linked with an interactive national Continuous Medical Education (CME) calendar and with official data of individual qualifications and work-place history hence it forms also an ePortfolio. Platform use and usability was tested at Helsinki Health Centre.

ePortfolios in Postgraduate Medical Training – From European Junior Doctors’ Perspective

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ePortfolio Working Group, European Junior Doctors

Assessment and registration of postgraduate medical training activities are mostly paper-based to date around European countries. European Junior Doctors (EJD) aim to evaluate experiences in its member countries and find possibly common solutions for a state-of-the-art electronic assessment tool: ePortfolio. Moreover, an ePortfolio system has more possible applications that focuses on self-learning, professionals’ progress and can support mobility. EJD designed a survey and organized a workshop recently – the outcomes will be presented in this paper.

ePORTUGUÊSe - The Power of a Language Network

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The ePORTUGUÊSe network is a platform developed by the World Health Organization (WHO) to promote initiatives and the use of ICT tools to improve access to health information in Portuguese speaking countries. Portuguese is the sixth most spoken language in the world with almost 300 million people living in eight countries (Angola, Brazil, Cape Verde, Guinea Bissau, Mozambique, Portugal, Sao Tome & Principe and Timor Leste) throughout four continents and four WHO Regional Offices. Considering that Portuguese is also the third most spoken language in the western hemisphere after Spanish and English and the most spoken language in the south, this platform supports Portuguese-speaking countries to improve their access to a wealth of knowledge and evidence-based health information contributing to the development and capacity building of human resources for health (HRH). Its main purpose is to generate an on going alliance of institutions and health professionals to disseminate, distribute and circulate information and use this knowledge to improve health care delivery and enhance health systems, ultimately to improve their Millennium Development Goals (MDG) targets.

Keywords: network, ICT, language, health information

Evaluation of Compliance to Telehomecare (THC) in a Group of Patients with Cystic Fibrosis (CF) in a Period of 2 Years

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Objectives In the present study, we examined data related to adherence to telemonitoring in our CF patients followed at home for a period of 2 years, in the aim to improve the follow-up in terms of efficiency and appropriateness. **Materials and Methods** We kept electronic records of transmissions, in spreadsheet format. For each transmission, the main parameters and any action taken were collected. Is carried out automatically a monthly summary of activities, a monthly average percentage of adherence to prescribed frequency of transmissions, monitored the contacts

and phone calls. Results We received in the period from February,15 2010 to February, 15 2012 overall 1364 transmissions in 515 days (1817 spirometry, 414 nocturnal pulse-oximetry and 398 questionnaires on symptoms) The average compliance in the reporting period was 10,16%, with increasing trend. Conclusions The improvement of outcome in FC necessarily passes through an improvement of the adherence to treatment. More psychological and behavioural studies are needed in order to gradually remove the obstacles which still prevent a further improvement in long-term outcome.

Keywords: Compliance, Cystic Fibrosis, Telemedicine, Telemonitoring

Evaluation of the Content of Teleconsultations conducted by the Telehealth Nucleus of the Medical School of UFMG-Brazil

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Introduction – The purpose of Brazil Telehealth Networks Project is to better the health care attention delivered to the users of the National Health System, by performing teleconsultation by experts of the Telehealth Nucleus of the Medical School who help family health team professionals of local health departments of municipalities of the state of Minas Gerais, Brazil. It is important to evaluate the content of the questions of family health professionals and the experts responses, identifying aspects of training and care, the quality and completeness of questions and answers, the chance of their replication as formative second opinion, their clinical aspects and insertion of the questions and answers within the healthcare model of the Brazilian National Health System and the resolubility degree of this tool. Objective – To evaluate the content of teleconsultations and their resolubility degree, to contribute to the qualification of the training of health professionals and qualification of health care, respecting the current health care model in Brazil and creating new models of the telehealth related teleconsultations. Methods - For the study we selected 2,300 teleconsultations requested by family health nurses, doctors and dentists, and their answers during the period of January 01, 2010 to October 31, 2012. From this universe it was calculated a sample proportional to the number of teleconsultation by specialty. Three hundred and ninety three records were examined by four physicians and public health professionals. It was constituted a roadmap for analysis with information on questions and answers with clinical and training aspects, and resolubility analysis. Calibration was done to verify the agreement between the evaluators and analysis of the tool. Data is being entered and consolidated into Excel spreadsheet and will be analyzed through a descriptive study. Results - The study is currently under development and is expected to be concluded results by February 2013

Keywords: telehealth, teleconsultation, primary care,

Evaluation of the User Acceptance of Patients to the Adoption of EMRs in Nigeria

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EMRs are one of the most important e-Health technologies and institute an array of benefits when implemented. Nigerian healthcare system however, is behind many countries in its infrastructure and the use of Information and Communication Technologies in healthcare including the use of EMRs. The Federal Ministry of Health acknowledges the value of EMRs. However, though a national EMR system has been developed, it has not been implemented. On the other hand, a few private hospitals in the country can boast of this system. In the implementation of information

systems in organisations, one of the issues faced is the unwillingness of the end-users to make use of the system in place and the health sector is not excluded from this phenomenon. User acceptance in Information Systems refers to the willingness of the end-users of a technology to accept to use it. While this subject has been discussed in various forms, its importance cannot be over-emphasized as it is often a decisive element in determining whether a technology will succeed or fail in its adopted environment. Various papers have been published to evaluate the reluctance to technology acceptance from the viewpoint of medical personnel as the main users of EMRs, but very little research from the viewpoint of the patients, whose medical information is being taken and analyzed. This paper therefore seeks to evaluate the perceptions of Nigerian patients to the use of EMRs and to determine the factors which may affect their use of the EMRs and to proffer solutions to better facilitate the acceptance of EMRs into the Nigerian healthcare system by patients. The data collection methods used in this research was questionnaires and interviews from both the few patients that have been exposed to EMRs and those that have not. Factors such as security, privacy and confidentiality due to the sensitive nature of the information on the systems were identified as determinants of user acceptance. Other factors that were more societal inclined were that of: trust, power to maintain the system, maintenance of infrastructure, and awareness of the benefits of EMRs. Most Nigerian patients are amenable to the use EMRs if data is secured

Keywords: EMRs, User Acceptance, Nigerian Patients

Evaluation of the Virtual Course in Telehealth for Latin American Countries

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Introduction - In the current global context of restructuring of health systems it is essential the development of sectorial evaluative tools. Thus the evaluation of the Virtual Course in Telehealth for Latin American countries is of fundamental importance as a factor for its improvement, as well as to other practices in telehealth. Objective - Evaluate the online course in telehealth having as reference some quality parameters listed in the data collection instrument used in the research. Method- It will be used as a research tool data collected by means of a questionnaire available on the platform to the participants of the online course. Some of the quality parameters listed in the questionnaire are: available content, teaching methodology, forum participation, project development, experiences exchange. Results - The results of this research are not yet completed, it still is in the data collection phase and final evaluation.

Keywords: telehealth, education, evaluation, Latin America

Evidence Based Medicine in HIV/AIDS and Reproductive Health Research: Piloting Two Distance Learning Courses in Low-Resource Settings

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Over the past decade there has been a growing demand for Evidence-Based Medicine (EBM) in clinical care and research. Not only is there more evidence available in health care, but also more opportunities for this evidence to be used in effective interventions and to link it to research questions. The practice of EBM signifies the integration of individual clinical expertise with the

best available external clinical evidence from systematic research. The benefits of evidence based practice are many-fold: knowledge of latest clinical evidence empowers healthcare workers to make informed decisions regarding optimal care, and empowers health facilities' workers to demand relevant resources. In addition, the use of EBM enables those working with(in) health facilities and programmes in identifying gaps in research and in developing systematic strategies to address these gaps. AFRICA BUILD (AB) is a Coordination Action to support the development of centers of excellence in health care, education and health research in African countries, using Information Technology. This project, developed under the 7th European Framework Programme (Grant Agreement no. 266474), consists of seven Work Packages (WPs). The Institute of Tropical Medicine in Antwerp is leading WP6 which is tasked with developing a specific training program in HIV/AIDS and Reproductive Health research in collaboration with the World Health Organization Department of Reproductive Health and Research (WHO/RHR), to be delivered via eLearning. The aim of this program is to enhance research and education in the above mentioned fields, via novel approaches and to identify research needs, emanating from the field. This pilot experience, which will be run both in English-speaking (Ghana), and French-speaking (Mali and Cameroon) partner institutions and produce targeted courses for strengthening research methodology and policy. Study materials will be available for the courses' participants through the AFRICA BUILD Portal and modules' content will be delivered via live webcasts. Through the courses described above, the students will learn and apply the steps of EBM, from the definition of a specific clinical research question and the design of a search strategy till the interpretation of the evidence and the application of the latter to practice, linking the detected gaps to possible research topics within the fields of HIV/AIDS care and Reproductive Health. Moreover, the students will be engaged in virtual communities of researchers who can continue to develop research ideas, exchange information and knowledge regarding new tools and evidence, as well after the short lifespan of the project.

Keywords: distance learning courses, HIV/AIDS research, Reproductive Health Research, low-resource settings.

Feasibility of A Monitoring and Feedback Tool to Stimulate Physical Activity of Chronically Ill Patients in Primary Care

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In the project It's LiFe! an innovative monitoring and feedback tool was developed. The tool consists of a 3D accelerometer worn on the hip, an application (app) on a Smartphone, and a server/web application. The patient receives feedback on the mobile phone concerning the amount of activity, the amount of activity in relation to an activity goal, and the response of a practice nurse based on the measured activity. A pilot study was conducted to test the technical performance of the tool in daily life, to test the usability, acceptance and user satisfaction and to get a first idea about the effectiveness. Therefore the tool was used by 20 patients in two general practices during three months. During this period, patients with COPD or type 2 diabetes consulted their practice nurse three times for behavior change counseling. A mixture of qualitative and quantitative measurements was applied. All patients and practice nurses were interviewed shortly after every consultation. At baseline and after the intervention, patients completed questionnaires about quality of life (EQ5D) and (exercise) self-efficacy (GSES and ESES). Physical activity data were automatically collected at the server and a log file was kept. Descriptive statistics and simple content analyses were used to organize data into categories that reflected the emerging feasibility themes. The physical activity data and questionnaires were analyzed with paired t-tests. Finally, results were discussed in a focus group with practice nurses.

Patients were merely positive about the usability of the tool, although motivation dropped when technical problems occurred. Those problems had to do with log-in and connectivity errors. Physical activity significantly increased from M 32,5 (SD 22,0) minutes per day in the first two weeks compared to M 42,0 (SD 23,7) in the last two weeks (P 0,01) and patients reported an better quality of life, scores increased from M 0,76 (SD 0,21) to M 0,84 (SD 0,17) (P 0,04). Both patients and practice nurses were mostly positive about the counseling program. In conclusion, without the technical problems, the It's LiFe! tool embedded in primary care is a feasible intervention.

Keywords: physical activity, accelerometer, self-management support

Feasibility Study to Integrate Implicit and Economic Information in Natural Language Processing Tools

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The computerization of information systems in health care organizations aims to optimize the use of resources and limit expenditures in context of health care deficits. Usually medical informatics systems have computerized medical procedures, clinical data for quality improvement and financial or billing information for insurance claims. Recently, the use of notes from doctors either in hospitals or primary care has also lead to a computerization in order to complement the information system to share with decision makers at all levels, including patients sharing the information with their individual doctors (workshop on natural language processing applications, Academy health, 2011). For instance, recent experiments such as the quasi experimental trial on Primary Care Physicians by Delbanco et als (2012) on portal and electronic messaging between doctors and patients show the growing interest of adding interacting processes between physicians and their patients adding also the sharing of open notes to the traditional information included in Electronic Medical Records. This contribution will aim to bring to this debate the additional use of economic information processed when a doctor or his team decide a clinical strategy in primary care for their patients. The influence of economic information is usually not limited to billing information for each procedure, test or medicine. Recording the type of barriers that constrain either the physician (because of the financial pressure on his organization or his own income) or the patient (because of his family budget or liquidity constraint) could possibly be of value to optimize a clinical strategy. Issues on how and when it is realistic to have some additional data on economic information coming from cognitive sources instead of limiting them to billing information will be discussed: they lead to discuss ethical and legal limitations in each national or organizational rules; but if they are used appropriately, they could help the transition towards reduced health care benefits for large proportions of patients under health coverage. Huttin C Access to drugs and the impact of financials on clinical decision ma

Keywords: natural language, open notes, economics

First Experience in Using Telemedical System Heart Wizard DELTA in Individual Prenosological Health Monitoring in Russia

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This paper presents results of using the new telemedicine system Heart Wizard Delta which has been worked out by the Institute for Bio-Medical Problems of the Russian Academy of Sciences

and Biocom Technologies. It combines advanced developments in prenosological health assessment during manned space flights and internet-technology of remote health monitoring and correction. Research protocols include blood pressure measurement, anthropometric data, health and life-style questionnaires, assessment of the risk of disease according to the heart rate variability analysis. The paper describes individual weekly assessments which were done by six volunteers. As a result, significant age-related and individual shifts of the parameters under control have been detected. The high sensitivity of HRV parameters to adverse factors (environment, stress, load) known from many other researches has also been confirmed. Stress Index of one of research participants increases dramatically during his preparation for an important business trip. It indicates tension of regulatory systems (SI = 184,38 c. u., versus 106,5 c. u.). The probabilistic approach has shown that on the same day the probability of normal functional states is decreased (31% versus 78%) and the probability of prenosological functional states is increased (67% versus 22%). Research findings confirm effectiveness of regular individual monitoring of the functional state of regulatory systems with follow-up assessment of adaptation risks. The new method combining traditional HRV analysis and probabilistic assessment of different functional states opens up possibilities to effective health monitoring in changing environmental conditions. Individual weekly assessment conducted with «Heart Wizard» instrument can detect disturbances of the autonomic balance prior to appearance of any health problems and also helps to monitor the effectiveness of preventive healthcare. After operation testing is over this system of individual prenosological health monitoring will go into series production in two languages (English and Russian). It means that many people worldwide will be able to use this technology for their well-being.

Keywords: individual health, prevention, prenosological monitoring

Four Existing EMCCs Working as one Virtual Emergency Operation Centre (VEOC)

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The terrorist attacks on 22 July 2011 in Norway - New project will increase the capacity of the medical dispatch system: "Four existing EMCCs working as one Virtual Emergency Operation Centre (VEOC)" Project: Study the factors necessary to establish a single virtual EMCC in the western region of Norway incorporating the four existing EMCCs. The vision for the EOC in Stavanger, Haugesund, Bergen and Førde are four centers working as one. This will result in a system that, from a patient's perspective, it will not matter from what location the caller dials 113, a significant patient care improvement. The caller or the patient will always be able to contact the appropriate and necessary emergency health services with a minimum of delay. The goal is to create a "Four-Center, One-System virtual EMCC" capable of delivering a system that will balance workloads and dispatch the 'nearest and best' resources for each incident across the western region. The system described as a "Virtual Emergency Operations Centre" will be a unified network of the existing EMCCs within a common technical, operational and medical platform. VEOC is a concept wherein the participants can share information, make decisions, and deploy resources without the requirement to be physically present in the same command centre. A VEOC can use a variety of technology and communications systems to compensate for the physical distance between the centres. The purpose of the virtual EMCC is to be able to pool the resources of several EMCCs when handling a big incident like the terrorist attacks on 22 July 2011 in Norway.

Keywords: Virtual medical dispatch centres

From a Research Project to a Regular Telehealth Service: Redefining Objectives and Strategies

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The Telehealth Network of Minas Gerais, coordinated by the University Hospital of Federal University of Minas Gerais, Brazil, was created in 2005 to develop a research project in telecardiology applied in remote areas. Along this period the research project has transformed in a regular telehealth service with more than one million EKG and about 50,000 teleconsultation in all specialties done. As consequence the financial funding has also changed. The initial financial support from public funds (Brazilian Health Ministry, State Health Department of Minas Gerais and research agencies) changed for paid activity based system for public and private sectors. In order to guarantee a sustainable growth all management strategies and considerations had also to be reviewed. Activity and economical indicators had to be redefined according to the new way of management. The objective of this work is to show the most important modifications on management in order to achieve the new objectives in a sustainable way.

Keywords: Telehealth service, objectives, strategies, management

From Many to One: Analysis of Information Models for Patient Centric Telemedicine

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ICT enablement of information sharing and exchange between health employees and citizens across organizations and private homes is one of the mechanisms to enhance patient empowerment. However, heterogeneity of information models and the employee-centric nature of most healthcare systems make information exchange, with a focus on the interests of patients, non-trivial. For example, it is not clear how the free-text and patient initiated interaction features of emerging patient empowering telemedicine can integrate to the many employee centric systems with heterogeneous information models. In this paper, we present results of information model analysis for the following standards: 1) Shared Medicine Card – a standard embedded in a Danish national service for medicine management of citizens; 2a) HL7CDA and 2b) PHMR, which are international standards for clinical document exchange; 3) Data Set for Chronically Ill – a national proposal for a standard for exchange of notes on lab results, diagnosis, etc., of long-term patients; 4) iCalendar – an international standard for management of calendar events. The standards listed above represent the following categories, each focusing on different user groups and operations: (1; 2a): healthcare employees and formal procedures inside a healthcare scope; (2b; 3): healthcare employees and care givers, also specific formal procedure, but closer to patient-centricity; (4) any group and generic calendar operations, i.e. no specific healthcare scope. Analysis is made with purpose of investigating requirements for the design and implementation of a patient centric information model that will enable patients to read and write information from a unified integration point or service interface and further contribute knowledge on patient empowerment through proof of concept demonstrators. The emphasis is placed on: analysis of glossary of concepts for the standards; a mapping model for the service interface; investigation of requirements for a future patient-centric telemedicine model; and finally, architecture for the information exchange, with read/write operations and middleware support.

Keywords: standards analysis, telemedicine, integration, patients

Gender Ratio in Engineering Disciplines: Why Are There Differences?

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In last decades there were many discussions about status of women in technology and engineering. Ratio of male and female university students corresponds to gender ratio in population. However when we look at individual study fields there are great differences. In the paper we try to show the situation in the Czech Republic considering number of university students and gender ratio in the country. Although women present majority among university students in Czech Republic, their number in technical sciences and engineering is still very low. Special attention is focused on Biomedical Engineering Master Program at the Faculty of Electrical Engineering, Czech Technical University in Prague. The motivation for female students to enroll this particular program was addressed, together with their observations concerning teachers' and other students' attitude toward them. Also, these observations were compared with observations of male students. Although in the Czech Republic the majority of undergraduate students are female, at engineering faculties situation is opposite. Current situation at FEE shows that the gender ratio at BME Master Program is the best among 24 Master Programs with enrolled students. According to students' feedback obtained by designed questionnaires, female students at this particular program were motivated to enroll to it by interdisciplinarity of the program, its modern concept, perspective and developing field. Answers also showed that female students were not interested in other Master Programs at FEE, but particularly in this one. Another conclusion that can be derived according to obtained answers is that approach of addressing students as early as in secondary school and introducing this program to them brings good results in practice.

Keywords: women in engineering, biomedical engineering

Gérontechnologies: State of the Art and Technology Validation

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The HDC (Health and Demographic Changes) project is an Interreg 4b project involving several partners from 5 different countries (Belgium, France, Germany, Luxembourg and The Netherlands). The evaluation of the gerontechnology market was one of the targets. After a market overview, three different domains have been defined: RTLS (location system), actimetry and technologies improving social link for elders. RTLS systems have been tested in hospital (CHU Liège, CHLuxembourg) and have demonstrated their usefulness for patient and care givers. The acceptance level of the system (bracelet) is high probably because it is coupled with an alert system, which could allow the hospital not to use physical contention for some patients. Actimetry can also be used as an alarm device but has also helped in the diagnostic process (i.e. fall detection, delirium, ...). This has been tested in the CHU Liège and Strasbourg but also at home and in a nursing home. The system looks like a watch and is then easily accepted. It gives information about patient activity. It can also study several other parameters, for example, the assessment of the quality of sleep. Social link technologies are used in the hospital through bedside terminals or at home via "tablet like" devices. At home, the tests demonstrate that elders are able to use that kind of system due to the design of the interface and like it. However, problems can occur, with family members, who don't realize the interest of such systems. In the hospital, patients use the device and often ask if they can bring it at home. First studies show that age doesn't influence the level of acceptance. The project ended with recommended actions. First of all, these technologies should be taken into account for the treatment and care of the elderly people. In order to do this, information has to be provided to the healthcare professional about the

possible uses of these technologies. For every new project, privacy and ethical factors must be reconsidered. Another recommendation concern the start of partnerships with providers in order to define and develop technologies dedicated to old people.

Keywords: gerontechnology, ageing, quality, telemedecine, actimetry

Hand Washing: Knowledge of Nursing Professional at a Secondary Hospital Institution

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Hand washing is the simplest and not burdensome measure to prevent healthcare associated infections. The aim in this exploratory and descriptive survey was to assess nursing professionals' knowledge about hand washing. The research project was analyzed and received approval from the Research Ethics Committee. The entire nursing team of a secondary hospital institution in an interior city of São Paulo State, Brazil, was invited to participate in the study. For data collection, the WHO questionnaire (2009) was applied, which contains 13 personal and professional identification questions and 13 questions on the theme, with the help of a hand mobile device (Galaxy Tab). For data analysis, descriptive statistics were used through SAS/STAT software (2003). Study participants were 86 professionals who signed the Informed Consent Form. Female professionals predominated (86%), with a mean age of 34.69 years (SD = 6.72). As for the function performed at the institution, 75.6% were nursing auxiliaries and 24.4% nurses. As for knowledge on the theme, 20.9% answered they had not received any training on hand washing at the institution and 56.9% mentioned that the microorganisms responsible for healthcare-associated infections are in the hospital environment, and not in patients and their proximity. Only 32.5% correctly answered the question about how long it takes for the alcohol preparation to destroy the microorganisms present on the hands. Based on the results, we conclude that continuing education is needed, using innovative strategies like available educational technologies, so that professionals can gain further knowledge in a motivating and pleasant manner.

Keywords: hand washing, infection, educational technology

Health Care Management with KeepCare

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Wireless sensing is part of our lives; major technological breakthrough on the areas of sensors, integrated circuits, and also on wireless communications, led to the creation of wireless sensor networks (WSNs). Such networks have multiple uses, from monitoring and tracking of people and goods, to the coordination and processing of activities in different contexts, they are used in industry, defence and healthcare application. As part of this use in healthcare applications KeepCare, a solution based on monitoring, tracking and processing of healthcare related information, is presented in this paper. This solution uses a WSN based application to monitor people's health and quality of life through vital signs and activity information received via wireless sensors. This solution monitors users such as elderly, people suffering from chronicle conditions in their home environment, but can as well be used in athletes or other professionals (e.g. first responders) that need to be monitored under hazardous conditions.

Keywords: Healthcare, e-Health, WSN, Monitoring VitalSigns

Health Center of Excellence - HCE

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Health Center of Excellence (HCE) HCE is defined as interconnected collaborative centers of professional knowledge and skills, which have common applicability to the benefit of all nations in South East and Western Europe. We speak here specifically of medical diagnostic, remote health care and training through knowledge sharing and second opinion which will facilitate effective healthcare knowledge deployment without undue concern for distance and local institutional resource.

Specific goals of the project Health Centers of Excellence (HCE) can foster South Eastern Europe (SEE) development and interaction and establish better cooperation among people within and beyond borders, especially in education and health-sciences. Collaborating HCE through their interaction are important to develop mutual respect, thereby to change attitudes of the past. Knowledge sharing in Radiology, Pathology, Cardiology, Dermatology, etc. as well in other health sciences, will bring professionals of the SEE countries closer to each other and to West Europe. This will enable and truly facilitate their integration into the broader Europe Community. Knowledge/skills sharing, interaction and collaboration could help overcome animosities from the past and create better environment in a common future.

Strategic Goals The human mind is the most complex information-processing tool we have. It is our goal to create intellectual product/s that can help health professionals and patients. Currently major investments in health are made in infrastructure and technology. Every day we are becoming more dependent on technology and heavy equipment. Intellectual/professional products and services are less important. In many cases experts are push or left aside. Less or non educated/trained staff can perform an examination without any expertise, patients are those who are suffering the most. They have lost confidence and looking for other treatments. They are paying large sums of money for the service that can be offered in the country or through the network of HCE experts. It is our experience that things we know have great practical only if they are shared.

Keywords: Health, Network, Excellence, Cross-border, overcome

ICT and Collective Intelligence Production in Favor of Collective Oral Health in Brazil: The Experience of Collective Oral Health SIG

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To support existing telemedicine projects in Brazil, and promote the development of new ones within the network, the Telemedicine University Network (RUTE), coordinated by the National Education and Research Network (RNP) was established in 2005. Since then, several initiatives have been developed in the area, including Special Interest Groups, which aim to advance knowledge and learning in specific areas, by mutual cooperation among members. SIG are linked to RUTE/RNP. This article reports the use of information and communication technologies (ICT) for Collective Oral Health Special Interest Group (COH SIG), which began operations in 2011

and has contributed to Collective Intelligence (CI) development - a new way of thinking - by means of sustainable social connections that become feasible through the use of open computing networks in internet area. The COH SIG has built this way of interaction and change in relationships between people and institutions using web conferencing resources, a website that contains information and monthly activities recorded for public access, as well as a virtual reading room with materials from the discussed topics. In addition, members of the COH SIG are interconnected by an e-mail group administered by RUTE. Currently, eight Brazilian public institutions are part of this group, including representatives from county, state and higher education institutions with degree in Dentistry. The group's contact with ICT has provided interaction between the various actors so that they can assist in the structuring, organization and functioning of health systems and services and permanent education. This strategy has allowed a renewal of the significance of the educational process in all workplaces, whether in universities or practice spaces. Thus, the group has been engaged in exchanging experiences, sharing content and knowledge, forming a network of collaborative learning and making sure that in this process, the connection of knowledge and! creative ideas has the potential to promote changes in thinking, feeling and acting to improve the oral health of the Brazilian population.

Keywords: SIG, Oral Health, ICT, Teledentistry

Impact of Telewound Monitoring on the Quality of Life of Out-Patients in Federal Medical Centre, Owerri, Nigeria

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Background: Mismanaged wound have social ,economic and clinical implication in the life of patient. Chronic wounds are wound that does not heal within 30 days. It a known fact that most mismanaged bruises could exacerbate to a more serious chronic wound . In developing country, with limited health facilities and bed spaces tends to forcefully eject the patient on slightest recovery; this trend has drastic implication in the quality of life(QoL) of the patient and most times, lead to wound breakdown. This study is to assess the impact of telewound monitoring in improving the quality of life of patient: pain and the healing time of the wound.Method:20patients of Telewound monitored group against the 19 of control group that visit clinic as scheduled were examined(Every 2 weeks). Biatain pain scale and healing time were used to assess the the impact of chronic wound on quality of life of the patients. Result: 37% reduction in healing time for telewound monitoring against control group. There is 29% reduction in pain in telewound monitored against 16% reduction in pain the control. Conclusion: follow up of chronic wound care, facilitate healing time and reduce associated pain thereby improving the quality of life of patient.

Keywords: telewound, healing time, QoL, monitoring,

Impact on Learning and Medical Practice of an Online Community of Practice for Rural Physicians in a Developing Country

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The investigation has as main objective generate the conditions for building a distributed community of practice (virtual) with general practitioners in rural populations in Colombia, as an alternative of informal education in the context of continuing medical education, enabling them to

build spaces of learning gaining in knowledge and expertise to solve problems in their professional practice. Doctors in rural populations in developing countries often have to work in conditions of limitation in technological and human resources. In most cases they have little access to continuing medical education activities to enable them to improve their training and practice because they do not have access to more experienced colleagues with whom share and adequately resolve their cases. The study was conducted with over than 30 general practitioners, who are scattered in different rural populations. As technological support or "digital habitat" of the community we used a mobile phone platform, which was widely known by most doctors, easy to use, low cost and high penetration. The basic methodology of the study was to share and solve collaboratively with all members of the community of practice different clinical cases of their medical practice. The more than two hundred cases in one year were resolved synchronously in real time that which provided a significant value to the community. It is relevant in the study, the betting to a "digital habitat" based on a mobile phone platform, which allowed the community to have significant value for its members, so that allowed resolve the cases immediately in real time synchronously bedside patient with low-cost technology and easy access taking into account that in developing countries the penetration of broadband internet is low while mobile phones penetration is widespread. Among the most important conclusions of this study are that the construction of a virtual community of practice can be a viable alternative as continuing medical education activity for rural doctors. Participation in the community of practice showed evidence of improvement in learning and problem-solving capacity impacting their medical practice

Keywords: virtual communities of practice, learning

Implementation of an Electronic Prescribing System: keys for a successful deployment

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Background An Electronic Prescribing System (EPS) was developed by MIMS SA in collaboration with the University Hospital UCL Mont-Godinne **Purpose** To implement the full computerization of the drug chain supply (DCS) including prescription by the practitioner, pharmaceutical validation, delivery and monitoring of stocks by the pharmacy, validation of the administration by the nurse and drug billing. **Methods** In 2006, - Creation of a workgroup to validate the specifications for the development of an EPS software related to computerized medical records and selection of MIMS SA for this development. -Two beds are computerized in a pulmonology ward, to test and validate the software. From 2007 to 2009, - 3 additional wards are computerized (Geriatrics, neurosurgery, revalidation). - Creation of an EPS steering committee composed of various stakeholders (management, physicians, pharmacists, nurses, IT team). This committee allows the installation of the means necessary for the deployment of an EPS in the hospital. - Installation of structured teams for the deployment: medical and nursing coaches From 2009 to 2012, -Deployment of OP'Drug, the EPS software. **Results** OP'Drug deployment is completed, covering 16 wards, emergency rooms, recovery rooms and treatment center medicine (TCM). **Conclusion** The computerization of the DCS is a challenge at the institutional level. The main assets of this project in our hospital are: - a general management, making of this project a priority within the strategic plan of the institution, - a steering committee where each type of stakeholder can express his needs, and prioritize requests, - a close medical coaching, - teams of coach nurses accompanying each ward before, during and after deployment, - a dynamic IT team making the bridge between the Institution and the MIMS SA. These points have emerged and are all essential as keys to a successful deployment.

Keywords: electronic prescribing system, drug chain supply

Implementation of Neonatal Intensive Unit Care Telemonitoring in Minas Gerais State, Brazil

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The Minas Gerais State government is working to create 200 new Neonatal ICU beds. One of the problems for the deployment of these new services is the lack of trained human resources in countries cities. Telemedicine resources should be used. **OBJECTIVE:** Describe the development of a telemedicine service for Neonatal ICU aimed in reduce neonatal mortality and support healthcare professionals in clinical decisions. The project is a partnership between the Health State Secretary of Minas Gerais and Telehealth Center of Medicine School at Universidade Federal de Minas Gerais. The project aims to promote specific training and technical assistance for health and administrative professionals. **METHODOLOGY:** A system of teleconsultation and videoconferencing was devised involving neonatologists with experience in intensive care in a Centre of Telemonitoring and neonatologists of ICU from countries cities. There is a monitoring and discussion of clinical cases. There are sub-specialists to make contact if it is needed. There is availability on duty, during the 12 h/day care, neonatologists and nurses. The data have been storage for future assessment and analysis for studies. Incorporation of new technologies for telemonitoring has been studied. The coordination has been organizing workshops for the ICU managers. Videoconference and semi-presential courses have been organized to offer permanent education for the professionals. **RESULTS:** The Telemonitoring Center has been organizing and so far it has been possible to make contact with 4 Neonatal ICU. Neonatologists and nurses were trained to use the system and they are organizing protocols to help the colleagues to work better in the new ICU that will be in function soon. The professionals of the Telemonitoring Center are identifying some difficulties to conduce the cases and videoconference will be done for permanent education. Daily at about 30 cases have been discussed since the beginning of the project, two weeks ago. **CONCLUSIO! N:** The ICU professionals have considered that the project is helpful for giving support in the decisions. The needs of permanent education have been identified for coordination.

Keywords: Intensive care neonatal, telemedicine, mortality

Improving Breast and Cervical Cancer Screening in Developing Countries Using Telemedicine

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Breast and cervical cancer are important causes of mortality in women in developing countries. Cervical cancer is the second deadliest cancer - after breast cancer, especially in Africa. But in developing countries exams are often not available. Especially in rural areas hardly any examinations are done. Examining breast cells by fine needle aspiration biopsy (FNA) or from a woman's cervix (VIA or pap smear) changes can be detected. Remote evaluation using a web-based telediagnostic platform delivers diagnoses to women in rural areas within the same day. In cases where no expert doctor is available and the next hospital is far away, telemedicine is very useful. Often screening, diagnose and treatment can be done at the same visit. This saves time and money as there is no need to wait for diagnoses and no need to come back to see the doctor. A national screening project includes evaluation of the actual situation in a country. It has to be found out which locations will be suitable for starting a screening project. Expert doctors will teach the local health workers and local medical doctors on site. Necessary equipment will be

installed and training will be provided. Doctors will return regularly to repeat training until the local medical doctors know how to do it independently.

Keywords: telemedicine, breast cancer, cervical cancer

Improving Mental Health Care in Afghanistan, Badakshan Province through e-Health - Phase 0

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Introduction: About 50% of people >15yrs in Afghanistan face some mental health (MH) problem. Prevalence is higher in young adults (18-25yrs), adversely affecting families and reducing productivity in this key age group. The most common issues in young adults are: Depression, anxiety, and Post-Traumatic Stress Disorders (PTSDs); drug abuse is a complication. The Government of Afghanistan's 'Mental Health Strategy 2009-2014', focuses on community based interventions and improving treatment, but does not have the capacity to implement desired solutions. **Solution:** The program will leverage existing health infrastructure (Community Health Workers (CHWs), Community Health Centres (CHCs), and a District Hospital (DH)), clinical networks (provided by Aga Khan Health Services - Afghanistan; AKHS-A), and available communication capabilities (web-based and wireless), to establish a receptive setting, and a sustainable and scalable e-health solution for young adults in Badakshan Province, Afghanistan that initially addresses their most common mental health issues. **Goals:** This ongoing study (2012-2015) will design, implement, and evaluate a sustainable and scalable e-health supported intervention that develops an embraced, informed, and accessible mental health care system in one province of Afghanistan. 1. Embraced. MH awareness building at each of the community, CHC, and DH levels, using SMS technology and other approaches, and focusing on young adults and the target mental health issues. 2. Informed. Skills and knowledge development will be achieved through face-to-face and virtual education strategies for CHWs and CHC and DH clinicians. In addition, the existing District-level Health Management Information System (HMIS) will be enhanced. 3. Accessible. Service delivery will be enhanced by introducing web-based (CHC to DH) and videoconference-based (DH to Specialist Hospital (Pakistan)) consultation options. All approaches will adopt only technologically appropriate and culturally sensitive e-health solutions (e-learning, teleconsultation, and e-record tools). The program will be evaluated (formative and summative) to demonstrate 'value' of the solution.

Keywords: e-Health, Mental Health, Afghanistan

Increasing Telehealth Knowledge in United States Veterans through Video Education

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Although Telehealth technology has been around for years, it has recently gained popularity as a way to increase access for patient care services as well as and to decrease cost associated with travel to health care facilities. Health care reform in the United States has called for creative and innovative solutions to problems with access to healthcare cost and disparities that exist today. One unique patient population affected is Veterans of the United States Military. Telehealth

services have proved to be an innovative and cost effective approach to reach rural populations such as Veterans. However, as Telehealth technologies and modalities of care expand, Veteran education on the subject of Telehealth is often times nonexistent. Although health care providers within the Veterans Health Administration (VHA) have been highly educated on the topic of Telehealth and the services Telehealth can provide to patients, many times Veterans are not formally educated on the topic of how Telehealth can improve their health care experience. One VHA hospital sought to identify interventions appropriate to increase Veterans knowledge of utilizing Telehealth technologies. In an attempt to increase Veteran utilization and educate about safety and security of Telehealth technologies, an Evidence-Based Practice (EBP) project change was conducted implementing an educational video describing Telehealth services. This paper presents the process used to educate Veterans and shares the positive results of how the educational video program positively influenced Veterans perception and anticipated use of Telehealth services.

Keywords: telehealth, Veteran, video education, technology

Indirect Blood Pressure Measurement: Assessment of a Continuing Education Program Offered on Mobile Device

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The course on indirect blood pressure measurement was ministered using mobile technology, was offered to nursing professionals from three Basic Health Units of the Western District of the city of Ribeirão Preto. This exploratory and descriptive study had the participation of 11 nursing auxiliaries who were monitored in four different phases: diagnostic, processual and summative assessments and use of mobile technology and theory and practice evaluation. Results indicate gaps in knowledge related to aspects that involve indirect blood pressure measurement, when evaluating the educational activities in the processual phase. Most professionals had a good performance on accomplishing the procedure after the course. All 11 (100.0%) positively evaluated the use of the mobile device (Tablet) in continuing education at service, indicating they would like to participate in other activities using the resource. It was concluded that this study has limitations due to the small number of participants and the rules established by the service as to the custody of equipments. Thus, further studies should be proposed in order to better scale the aspects identified by this study as limiting.

Keywords: education, nursing, application mobile device

Initial and Advanced Training Course for Telemedical Experts (Conclusions)

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Over the past years there has been a significant increase in the number of telemedical training and consulting centers all over Russia. Quite often employees of these centers seek advice of the Russian Association for Telemedicine. Growth in the market of videoconference equipment and, consequently, an increasing range of products purchased for new telemedical centers has created a need in training professional technical consultants. We believe that new experts must not only learn from the experience the Russian Association for Telemedicine has but continuously upgrade their knowledge in this area. This work analyses an interactive approach for developing a training program and identifying a list of issues that a professional consultant can solve. Our past

experience has demonstrated that the initial training does not provide a high level of qualification. Therefore, we attach great importance to continuous education. However, busy schedule of telelectures and teleconsultations makes it hard to allocate time for comprehensive training. At the same time telemedical centers must ensure the best technical support for telelectures of the best Russian doctors. All the above mentioned reasons made us organize a training course for professional consultants. In our opinion, the primary goal of training professional consultants is to make sure that each professional is able to help his colleagues without visiting local telemedical centers that can be located thousands miles away. The work process must involve all means of communication: telephone, e-mail, videoconference. Since in many cases initial assistance is needed for adjusting videoconference equipment (particularly for mobile equipment), cooperation with consultants starts with a telephone call or an electronic inquiry. The experience that we have accumulated in the area of training telemedical consultants and organizing training courses has been analyzed in this work in detail. One of the results of the training program is an identified need to establish an expert group that can provide technical advice on a wide range of video conference equipment or provide assistance should any problem arise in the c

Keywords: training, experts, technical, advice, telemedicine

Innovative AAL Solutions for Ageing Well

K. Marcus

AAL Association

The Ambient Assisted Living Joint Programme (AAL JP) is a funding activity running from 2008 to 2013, with the aim of enhancing the quality of life of older people and strengthening the industrial base in Europe through the use of Information and Communication Technologies (ICT). The projects funded until now cover the topics of ICT based solutions for: - Prevention and Management of Chronic Conditions of Elderly People; - Advancement of Social Interaction of Elderly People; - Advancement of Older Persons' Independence and Participation in the "Self-Serve S Society"; - Advancement of Older Persons' Mobility; - (Self-) Management of Daily Life Activities of Older Adults at Home and Supporting Occupation in Life of Older Adults. In this presentation the framework of the AAL JP will be presented, along with examples of projects that have great potential to contribute to the active and healthy ageing of the European population and create growth opportunities in Europe.

InspectLife – Platform for Providing Telecare and Telehealth

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InspectLife is a platform for telecare and telehealth. Its main components are: surveillance of elderly people, children and chronic patients; ambulatory monitoring of physiological signals and parameters (blood glucose, blood pressure and others) including advanced data processing, visualization and analysis; and communication between all participants involved in the process of surveillance of clients and treatment of chronic patients. The fundamental component is web based information system InspectLife, which is accessible via web browser by authorized users, mainly clients, family members, operators of surveillance assistance centres, physicians and medical staff. The InspectLife solution should ensure preservation of clients' independence, improvement in their self-sufficiency, safety, quality of life, social contact and also quality of health care. Pilot projects were organized within the Czech Republic and Australia and their results were evaluated.

Keywords: surveillance, diabetes, telemonitoring

Integrated Model for Standardization of Electronic Clinical Records by Levels of Telehealth Center in Colombia

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Colombia is currently facing the challenge of the standardization of Electronic Clinical Records due to the incorporation of new providers that have implemented an information system based on new information and communication technologies without interacting among them. It leads to considering clinical records as a collection of the information raised through the relationship between a patient and their physician and NOT as part of an integrated clinic information system. The Ministry of Health is responsible for "regulating the collection, transfer and disclosure of the information in the subsystem where the members of the system compulsorily converge." Through Resolution 3374 of 2000, the Ministry of Health establishes the basic details that health service providers must issue. In this regard, the Centro de Telesalud (Telehealth Center) of the Universidad Militar Nueva Granada creates an Electronic Clinical History or Medical Record model by levels of hospital care with an aim to record the required patient information depending on the needs and thus integrate the information raised by different health centers, clinics, dispensaries, hospitals, etc. The model is being validated in Level I hospitals in Bogota, where there is NOT standardization of Electronic Clinical Records gaining responsiveness from governmental bodies.

Keywords: Electronic, clinical, history, telehealth, level

Integration Model Applied To Healthcare Services

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The Colombian Armed Forces (FF.MM, Spanish Acronym) consist of the Army, the Navy and the Air Force. Each one of these institutions provides telemedicine services to their members. In this context, the Universidad Militar Nueva Granada (Bogota-Colombia) plays the role of intermediary agency amongst them and concerning new healthcare services. This case study describes an initiative undertaken by the Universidad Militar Nueva Granada, in its role as an articulating agency, to create a model enabling the integration of healthcare services in a multidisciplinary, cooperative and open manner inside the Armed Forces of Colombia. In addition to acting as an articulating axis for the different services furnished by each institution, the integration model helps guide the interoperability and reutilization of such services. While carrying out this work, some generic integration models were analyzed in order to adapt them to the methods, solutions and experiences of a country waging an internal war. The first applications of the proposed model are illustrated using Electronics Clinical Records, Tele-consultation and Tele-education, to name but a few.

Keywords: integration model, healthcare, services, multidisciplinary

Interactive Mobile Platform Structure to Monitor, Organize and Evaluate Medical Home Care Protocols

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Home Care establishment Soins et Santé is based in Limoges in France. It manages several services (Nursing home care day and night, therapeutic day care for people with cognitive impairments, two home care teams specialized in Alzheimer patients, a twenty-four hours a day nursing centre, and a support platform for family aidants). Referring to the large diversity of the competences and provided care services, the structure has to manage multiple medical file formats, with the increasing necessity of correlating them. The objective is to ensure more homogeneity and continuity in the medical support for patients who would be connected to different services. This care centre aims to develop innovation through the use of new technologies and in particular to adequately and efficiently define and use digital archives for Personal Medical Records (PMR) rather than paper archives or separate electronic file systems. However, the conditions for a suitable home support goes through the actual effectiveness of the prescription, administration and monitoring protocols of care. We present a system of audit to globalize the nursing process and its effectiveness, initial management to assess the impact of care on the well-being of the person. The proposed solutions pass through the definition of interactive mobile device to optimize both the definition of adequate care protocols, in administrative and medical terms, and the optimization caregivers' practices. Our data structure will be based upon a service-dedicated PMR with an administrative-oriented approach. The interface (the ICT object) will propose different interaction modes which will adjust to users throughout the care protocol prescription, validation and post-evaluation processes. At each step, the tool will provide information and contextual assistance, enable real-time validation, and store data for further statistical analysis of both the efficiency of a single protocol or of the medical path of a given patient. Global statistics will be also provided to evaluate the improvement in terms of administrative management and service coordination and connection.

Keywords: Care protocol, interactive tool, organization

Issuing Mammography Reports through Telemedicine and the Information Management System to Meet the Needs of the Public Health

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The population of the state of Minas Gerais consists of 19,593,330 inhabitants, distributed in 853 municipalities, that are organized in 13 macrorregions (IBGE - 2010). Those municipalities often lack the infrastructure and the human resources in their Radiology Services, for the provision of specific demands such as mammography. Aiming to optimize workflow, reduce the costs and increase quality and productivity it is necessary to develop radiological reports of mammograms through telemedicine. This tool allows for better data storage and management of images, including access to previous examinations of patients, as well as faster distribution and release of the mammography reports to patients served by the network. The Health policies of the Federal and of the State government, for the prevention of breast cancer are this way, able to achieve its goal of early detection of breast lesions in a more widespread and efficient manner, therefore reducing mortality and mutilation caused by late diagnosis. . OUTCOMES: Early diagnosis of breast lesions, cost reduction, optimization of administrative processes and faster access to treatment reducing the accumulated demand for care . GOALS: provide connectivity for all the mammographic equipment that are generating images on "Viva Vida" Secondary Reference Centers (CVVRS) through a "Picture Archive and Communication System" (PACS) fully integrated in a "radiology information system" (RIS). Provide reports for the mammograms through Telemedicine ; registering in the Information System of the Ministry of Health the

procedure as a “SIA / SUS” procedure (Outpatient Information System / Health System); register, download, and / or integrate with the official / governmental mammograms system - SISMAMA (Information System Breast Cancer); deploy system management databases with access to profiles of interest (Professionals, Managers local, regional and state, etc.) ; empower 100% of designated professional to operate the system locally; audit 2% of radiological reports of the mammograms ; reach at least a 98% accuracy of the audited. radiological reports

Keywords: ICT, training, telemedicine, mammography, CVVRS

IT System for Alarming of Possible Health Risks caused by Geomagnetic Storms

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The modular information system (MIS hereafter) for increased quality of life specifically target, but is not limited to, a group of people that are more likely to incur into health related risks because of geomagnetic storms. This group comprises mostly patients with heart diseases, respiratory diseases and others. The MIS is a modular information system comprising an e-service for providing the current value of the local geomagnetic index K (K hereafter) and a set of pluggable modules. The MIS makes an application available to end-user’s mobile phone or computer device. The application is specifically designed to be used for self-health monitoring. This way the user has access to the geomagnetic index. Additionally the user may input day-by-day health related data as e.g. blood pressure, pulse, blood glucose, body weight, etc. All those data enable the evaluation of user health conditions. Upon the user’s request the values of K recorded over a longer period of time may be presented in the application automatically. Additionally those data may be correlated with the input user health conditions stored in the application internal data base. Consideration for user privacy was one of the main system design guidelines. Therefore all transmitted data to/from server are first anonymized. The system is designed to enable easy future upgrading as well integration in other systems. Another important guideline in designing the MIS was compliancy with international trends and standards being adopted nowadays in the field of e-health sector. This allows the MIS system to be easily integrated in modern e-health systems including real-time e-health information networks. Such an information center enables the transmission of data on critical weather conditions, forwarding the physician’s recommendations to the end-user, and forwarding an alarm from end-user to his doctor or other relevant person if his/her health condition deteriorates.

Keywords: geomagnetic index, e-health, mobile application

Knowledge of Nursing Professionals about Gloves Use

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Gloves use is part of standard precautions, measures used in healthcare environments to minimize hospital infection rates. The aim in this descriptive and exploratory study was to evaluate nursing professionals’ knowledge on the use of gloves. The study was developed at a secondary public hospital in the interior of São Paulo State, Brazil. After receiving approval from the Research Ethics Committee, the entire nursing team was invited to participate in the study. For data collection, the structured questionnaire by Ferreira et al (2009) was applied, which consists of 25 multiple-choice questions on the theme, using a hand mobile device (Galaxy Tab). For data analysis, descriptive statistics were used, through SAS/STAT software (2003). Study participants were 86 professionals, who signed the Informed Consent Form. The majority was female (86%),

with a mean age of 34.69 years (SD = 6.72); 24.4% were nurses and 75.6% nursing auxiliaries. Concerning knowledge on the theme addressed, 54.6% answered using sterile gloves as equipment for surgical wound dressing or intravenous medication administration, 11.6% answered not using gloves and 2.3% answered that they could not answer that question. For capillary glucose, 8.1% answered that they perform the procedure without gloves. Based on the results, we conclude that continuing education is needed, using innovative strategies like available educational technologies, so that professionals can gain further knowledge in a motivating and pleasant manner.

Keywords: protective gloves, educational technology, nursing

Learning Objects, Professional Competencies for Health Professionals and e-learning: Main Elements for Developing a Taxonomy

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The Open University of the Unified Health System – UNA SUS (www.unasus.gov.br) has been developed by the Ministry of Health from Brazil, in partnership with public universities and health services from states and municipalities for in service training and education for health professionals working at SUS, which is approximately 2,5 million health workers. One of its main components is the production of interoperable and reusable learning objects (LO) according to the needs identified by the professionals at work, dealing with healthcare and also management matters. The LO are published in an open public and free of charge repository (www.unasus.gov.br). The demand for LO production is higher than the already installed capacity of the 18 universities that work collaboratively as a network, can afford. One strategic question for expand and at the same time maintain quality of what is supported by public funds, is to establish standards and for that we plan to develop a taxonomy capable of describe pedagogical, technological and professionals competencies and skills that are expected to be developed by a determined LO, for it to be interoperable and reusable. Most LO repository nationally and abroad present materials that do not define clearly what are the competencies that are expected to be developed by its e-learning use. If we can match each Learning Object to a corresponding instructional project describing the necessary competencies that health professionals, specially those working in primary health care, we may interoperate and reuse LO with effectiveness and higher quality.

Keywords: learning object, e-learning, health professionals

LIFE 2.0: Geographical Positioning Services to Support Independent Living and Social Interaction of Elderly People

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The number of people over 50 will rise by 35% between 2005 and 2050 and the number of people over 85 will triple by 2050. Recent OECD analyses forecast escalating costs as a result of ageing populations in Japan, the US and Europe. In addition, European Commission predicted that in 2010, 32% of people Europeans with 65+ years old will be living alone and the proportion will rise to 45% in the case of people with 85+ years old. In the context of elderly living alone, their welfare is usually related to maintain their independent living conditions, i.e. the ability to manage their life styles in their preferred environment, maintaining a high degree of independence and

autonomy, enhancing their mobility and quality of life. Life 2.0 project is a CIP-ICT-PSP EU funded project with the objective to make the network of social interactions more visible in order to support independent living conditions through the use of an ICT based approach. The target users of Life 2.0 are elderly people living independently, their relatives, assistants and older people service providers (including companies or organizations devoted to provide services for elderly). The ICT based platform created within Life 2.0 context, is being developed from a Living Lab approach and end users from four countries (DK, FI, IT and SP) are actively participating in the development of the platform services, its contents and in defining accessibility patterns. Life 2.0 platform is accessible from web and mobile devices (iOs & Android). It is composed of three different scenarios: in the first one, users can offer or request services from others in order to maintain or increase their social interaction. These help offers or requests are geographically positioned with the aim that elderly people could be aware of the social interaction in their local areas and their neighborhood. The second scenario is where organizations, such as elderly activity centers or social centers, can offer their own services to elderly. The third scenario is for companies that develop their professional activity for elderly people and their participation will assure the economical sustainability of the platform.

Keywords: elderly, active aging,

Low-Cost Vitals Screening over Cellular Networks

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The overall Speaker's topic is to discuss the development of secure cellular-based suites that enable users to easily transmit vital signs data via the cellular network, to health care professionals worldwide. The concept of vitals screening over cellular networks is a provision of health care services using telecommunication technology to provide solutions over a geographic distance. Cellular access to vital signs allows patients to keep their health regime intact, while being mobile at the same time. As the global health care market slowly changes from a traditional health care system to a more modern electronic health care system that utilizes technology through increased usage of electronic health systems there is lessened need for the hospitalization and physical movement of patients as well as enriched health system service coverage. The taking of vital signs via cellular networks will ultimately decrease hospital visits, thereby decreasing the overall cost of health care expenditure. The same premise is also most valuable in disaster recovery scenarios, particularly first-48-hour response windows. This system might become a filtering or triage system allowing a more sensible approach for the management of patients. Dr. Killcommons will identify the reasons that vitals capture over cellular networks is going to be an important component of the modern health care system and will decrease pressure on the existing health care infrastructure. He will also address the underlying technology of the cellular network premise, and how it can be rapidly deployed in various scenarios.

Store-and-forward technologies may be used in a cellular milieu so as to integrate vitals into an EHR, and Dr. Killcommons will briefly discuss this incorporation of such clinical information.

Keywords: Store-and-forward technologies, Vitals capture, Cellular-based suites, Disaster recovery

Manufacturer Independent Interface for Cardiac Rhythm Disease Management

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The number of patients with cardiovascular implantable electronic devices (CIEDs) is steadily growing due to technological developments, additional indications and the growing number of elderly in the population. Implantation is only the first step in the lifelong CIED therapy process. According to international guidelines, device parameters are checked in follow-ups every three to twelve months using manufacturer dependent programmers. This results in an increasing workload for device monitoring, requiring reorganization of the follow-up management. Since 2004, AIT has developed a platform for integrated cardiac rhythm disease management (PICARD), which represents a central management platform for all relevant CIED data, follow-up history, therapy documentation, medication and report history. The major integration aspects refer to data and process integration and are realized by interfaces to a device database, a web portal and the hospital information system. Up to now, CIED data read out by programmers had to be typed in manually in the web-portal. The aim of the current work was to advance this situation towards an automated import of relevant parameters. Therefore, an interface for programmers of different manufacturers was developed. It utilizes a Bluetooth connection between programmers and PICARD (if supported by the programmer device) and features automated import of data stored on the programmer, while the user still has the chance to manually add, delete and modify data. Due to different proprietary file formats of each manufacturer, relevant parameters in the files are mapped to PICARD specific parameters. The data acquired manually and automatically are then processed by a merging algorithm that detects discrepancies and features conflict management. Before parameters are finally stored in the database the user has to check and confirm their correctness. The interface was prototypically implemented and tested using existing examples of exports from different programmers. Future work will include evaluation in a real-life scenario and inclusion into the routinely used PICARD system, which is planned for 2013.

Keywords: Ambulatory monitoring, Cardiology, Interoperability, eHealth

Mconf: A Webconference System Applied To E-Health

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This abstract presents an open source distributed, scalable and federated global webconference system called “Mconf: Multiconference for interoperable access web and mobile devices” (<https://mconf.org>). The system can be applied to e-health, among other uses. The conferencing component of Mconf is powered by BigBlueButton (BBB) with improvements developed by the authors. This component provides the following features: real-time sharing of voice, video, slides, desktop, notes and chat. It is also possible to record sessions for later playback. The scheduling component of Mconf is the web portal (Mconf-Web), a Ruby on Rails application that provides creation of virtual rooms, discussion forums, and event scheduling. Mconf-Web uses a web application called Global Plaza as its basis. The mobile component of Mconf is the Android client, which allows users to fully participate in sharing of audio, video and chat. Related to scalability, the Mconf project launched a global network in June, 2012, and by December was with 11 servers distributed among three continents and some countries and states in a pre-deployment phase. We expect at least twice this number by the time of the paper’s presentation, and in two or three years we expect hundreds of servers cooperating to form a world global webconference network, helping thousands of users daily. Regarding e-health, the main initiatives were in a program of the Brazilian government called “Telessaúde Brasil”, which deals with experience exchange and remote education among health centers in country areas and big hospitals in urban areas. The system allows also the streaming of events to thousands of users due to cooperation of the distributed servers. Besides that, it is possible to perform remote attendance, second medical opinion, transfer of images and documents, dealing with images synchronously

(pointing and writing), among other possibilities. The presentation will include a practical demonstration of the system interconnecting people of different countries through audio, video and images, showing its possible uses to e-health and stimulating the audience to join the network.

Keywords: Telemedicine; videoconference; remote attendance

Melanoma Screening Using Telemedicine & eHealth - How an Organized Service Worked in an Effective Way

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I will be presenting a Telemedicine system that was developed to screen suspicious moles. Malignant Melanoma is the deadliest form of skin cancer and the fact of its asymptomatic evolution makes it a good candidate for early detection through non-invasive ways that can seamlessly analyze moles in regions where dermatologists aren't available. At the present moment it's widely accepted that the best way to deal with Melanoma is through prevention and to observe caution regarding sun exposition and also through the self-observation of skin lesions and moles. To help people on that analysis a mnemonic called the ABCDE test, as been proposed by the dermatologists and it consists of analyzing the following variables: A - Asymmetry B - Borders (irregular) C - Color (variegated) D - Diameter (greater than 6 mm (0.24 in), about the size of a pencil eraser) E - Evolving over time The Telemedicine system that I will present operates on an eHealth platform that receives, from a remote location, images of a suspicious mole and allows a group of enrolled and experienced dermatologists to analyze those images and decide whether they are benign or if they show signs of being malignant giving this way the opportunity of referring for removal on an early stage. The device shines near-infrared and visible spectra light from a handset through the skin. In particular it measures the amount of hemoglobin, melanin, collagen and whether melanin is in the epidermis or the dermis. The information is presented in the form of color images, which show how these measurements vary over the specific mole that it's being analyzed. To conclude I will explain all the workflow behind the operation and also a clinical case that was screened with this system and referred to removal and biopsy that proved to be a malignant melanoma at a very early stage that enabled a very good prognostic of total remission!

Keywords: Screening, Melanoma, Telemedicine, eHealth

mHealth & 2nd Generation Telemedicine: Making the Medical Home Mobile to Provide Care for World Populations

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meVisit, USA

Delivery of medical care to all remains one of the world's greatest challenges. Fiscal constraints, limitations in skilled medical providers, and disparate resource distribution affect industrialized and developing nations equally. As cultures increase integration of online communication and upgrade mobile infrastructures, interactive mHealth offers to revolutionize healthcare by providing low-cost access to medical providers and information which improves patient engagement and overall population health.

A 2-year Clinical Study with the Univ of KY (USA) investigated the application of eVisits within the Medical Home through a 3G & 4G Smartphone mobile platform. Cases were derived from a rural KY primary care practice, w/ 24-hour physician access. Patients completed an Internet-based Medical Interrogation Engine questionnaire, with an option to add free-text and up to 5 pictures.

A formatted History of Present Illness, any attached media as well as a Personal Health Record was provided to the physician's Smartphone. The physician reviewed the information, completed an assessment/plan, and contacted the patient's pharmacy if prescriptions were required. A unilateral option was available to the physician for real-time video and/or audio utilizing the Smartphone. The patient received a diagnosis, treatment plan as well as self-care information relevant to their chief complaint. The average case turnaround time was < 3 minutes for the physician. The Study documented safety, quality, high patient and provider satisfaction as well as significant decreases in per-capita costs and increases in provider capacity.

mHealth offers opportunities for all nations to leverage their existing medical provider pool to increase access to healthcare for their populations in a manner that is safe, high quality, cost-effective and that increases patient engagement in their personal care to improve overall population wellness.

Key Words: mHealth, Telemedicine, Smartphone, cost-effective

mHealth-Based Telecare for the People Affected by Disasters; Organization of Health-related Volunteer Help

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Maintaining the citizens' health after natural and unnatural disasters is of great importance. This is because the people affected by such events are more vulnerable to different physical and mental diseases and immediate attention should be paid to them. One of the latest approaches that can be used in this regard is 'telehealthcare', specifically 'mobile health'. The importance of this approach can be found in the fact that wireless mobile networks are accessible worldwide and are less likely to be impaired by such events compared to other communication networks. After such disasters, health systems in all the countries, including even developed ones, are in need of volunteer help along with the predicted and planned actions in order to handle the health crisis caused by such disasters as soon as possible. Also, right after such events, there usually is a great tendency in the society to help the affected people. This helps solve the food and clothing problems, for instance, to some extent, but volunteer help to meet long-term needs of these people including healthcare is usually overlooked. This project seeks to organize such tendencies for health-related volunteer support by the public and by using communication facilities efficiently based on mobile-health, this approach aims at promoting the health level of the damaged people effectively. In the core of this plan, there is a Health Call Center which is defined under the Ministry of Health. This center links the healthcare workers working in damaged areas with the specialist physicians and healthcare experts. Volunteer specialists sign up for this plan and specify when they are available to serve this system. This center transfers the calls from healthcare workers in damaged areas to the physicians, depending on their availability and specialty. As a result, virtual presence of the medical specialists in damaged areas is feasible and 'teleconsulting' can be utilized to serve the people in need of these services. (Following the earthquake in northwest of Iran in summer 2012, the detailed design of this plan was submitted to the health department of Tabriz University of Medical Sciences.)

Keywords: mHealth, Volunteer Help, Disasters,

Mobile Personal Health Application for Empowering Diabetic Patients: The Case within EMPOWER Project

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When talking about e-Health and m-Health, it is easily seen nowadays that mobile apps consist one of the most promising facilitators in healthcare provision. Mobile Personal Health Applications (PHAs) exist not only for wellness & fitness but also for monitoring chronic diseases, such as diabetes, which actually is ranked highest in terms of business potential for mobile PHAs. In this paper we present the conceptual design and first prototype of a mobile Personal Health Application that addresses Type 1 and Type 2 diabetic patients. The application features functionality related to the collection of Observations of Daily Living e.g. vital signs, nutrition, physical parameters such as weight, mental parameters such as self-assessment of quality of life, level of mood and stress, sleep quality and physical activity related information. The focus of the paper is on highlighting the way the application makes use of the embedded smartphone sensing and communicating capabilities to orchestrate the collection of Observations of Daily Living. Also, the way the collected information is being organized and assembled into simple yet understandable and meaningful visualization graphs is presented. Another important aspect to be covered is the way attending clinicians are being kept in the loop and foster patient empowerment: more than being a simple logger of the –manually or automatically- collected Observations of Daily Living the presented mobile app also acts as a feeder for a centralized action planner that guides the patient in the scheduling of activities related to the management of her chronic disease, as well as to a recommender engine that acts as a decision support system for the clinicians to formulate personalized recommendations for disease self-management.

Keywords: mobile personal health applications, diabetes

Mobile Video Transmission System using IP Network Camera and MiFi

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Pre-hospital telemedicine provides real-time accurate information and connects EMS personnel with physicians at long distance. However, live video transmission in moving ambulances is problematic in Thailand because of no fixed IP address support and limited bandwidth. Phramongkutklao Hospital has developed a highly innovative system designed to work with EDGE/3G cellular networks. The system incorporates an IP network camera, a MiFi (personal mobile WiFi), and a Lithium-ion mobile power charger. The Pan/Tilt camera has a plug and play action, without the need of the fixed IP address, offering maximum 640x480 pixels, 30 frames per second, and H.264 video compression. The camera is connected to the internet through MiFi. The 12,000 mAh Lithium-ion battery supports the camera and MiFi to remain online up to 6 hours. The live broadcasting from incident scenes and from high-speed moving ambulances was good in terms of telecommunication parameters (latency, image quality, video fluidity, and frame losses). Physicians can monitor the real-time events and control the camera remotely with any PC, iPad, or Smart phones. The network access storage function provides the recoding of the video and snapshot files. The bandwidth requirement, depending on resolution and frame rate settings, ranges from 64 kbps to 512 kbps. At optimum setting (320x240 pixels, 4 frames per second), delay time was less than two seconds in 3G links. This novel system demonstrated excellent performance in terms of user-friendly operation, auto-reconnection, data compression ability, bandwidth optimization, streaming technology, and network access storage function. The Low cost (800 USD/Unit) allows for installation on all ambulances and volunteer EMS.

Keywords: mobile, video, Telemedicine, Phramongkutklao Hospital

Mobilicare: A Health Monitoring System for Chronic Patients

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Mobilicare is a mobile health promotion system designed to: a) remote monitoring of patient's vital signs in real time and in their homes; b) support of a Healthcare center; c) self-awareness of the disease and motivation. The system is composed of three main entities: 1) The equipment in the patient's home, which is composed of a tablet and a variable number of vital monitoring sensors according to their chronic diseases. The most common are Glucometer (for diabetes), Blood pressure (for hypertension) and Scale (for weight control). Some of them receive a Pedometer, used to monitor the amount of physical exercises. The software in the tablet allows the monitoring, graphic generation and two way communication (with the sensors, gathering the data via Bluetooth, and with the HealthCare Center, sending the data via 3G). Besides, it also allows videoconference with their doctor, family and the Healthcare center. It also has some video tutorials about the patient's disease to improve their knowledge and motivate them even more. 2) The Healthcare Center, which concentrates all patient's data. If there is an alarm on a patient, their data appear in the beginning of the list, and a sound is generated, followed by a yellow message. The Healthcare Center has also all the information about the patients, as their performance bar charts, telephone, name and telephone of close people, name of doctors, medicines that the person is taking, visit records, among other. This information can be used for decision making, as for example to call the patient and offer help. In extreme cases, it is possible to send immediately an ambulance to the patients' home. 3) Server in the cloud, which is used to store all the information and allow transparent web access. The system works with web browsers, being suitable for many platforms, however, the main focus at the patient's home is the tablet with Bluetooth access to the measurements, minimizing digitation errors and improving the usability. The presentation will include a practical demonstration of the system showing the user and the healthcare Center interfaces, demonstrating the system for at least blood pressure and ECG sensors.

Keywords: Telemedicine, telemonitoring, telehealth, Health Promotion

Modern Methods and Materials in the Undergraduate Education of Medical Imaging – How to Implement in Postgraduate Medical Training?

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Modern methods and tools are inevitable in medical education – both undergraduate and postgraduate level. Our department has experience with eLearning tools and other state-of-the-art educational equipment, designed for radiographer BSc and medical students. Setting new achievements and meeting the expectations we want to extend our educational duties for postgraduate training of healthcare professionals, including physicians, radiologists and non-doctor professionals. Our way for this transition is presented in this paper.

Monitoring Biosignals with Low Cost Wearable Sensors

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With the increase of aging population, we have been witnessing a decline in the quality of life influenced by numerous social, cultural and economic factors. Several studies have addressed these facts and some emerging technologies are capable of monitoring and anticipating these problems. With the advance in the development of smart textiles it's possible to use these technologies in the acquisition of biosignals, which allows to obtain a better comfort regarding the use of smart clothes over traditional Ag/AgCl electrodes. This way it is possible to obtain a monitoring for a longer period of time without causing irritation to the user's skin. The objective of this paper is to develop a low cost sensor with the capability of monitoring the electrical activity of the heart, measuring the heart rate and body temperature and it will be applied in two different scenarios. Health environment aims targets the continuous measurement of vital signs and the firefighters of future, where each firefighter uses a t-shirt equipped with the sensor that sends data to the central where the commander can view the state of fatigue and stress of each firefighter.

Keywords: ECG, textile, continuous monitoring

Multi-Agent Orchestration of Emergency Response in Saudi Hospitals: The Case of Al Ahsaa Area

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The shifts experienced in the environment of disaster operations and emergency response are reshaping the context of information acquisition and utilization in hospitals. In addition to the formulation of emergency response plans, there have been a growing emphasis on the use of advanced information systems to improve the efficiency of emergency response processes in Al Ahsaa' hospitals. The examination of emergency response management in the hospitals of Al Ahsaa area of Saudi Arabia revealed that there is a considerable inefficiency in emergency response operations, a significant difficulty in harmonizing emergency response activities and different complications regarding the engagement of emergency response stakeholders (hospitals, Red Crescent, Civil Defense Authorities etc). According to these results, this paper proposes a multi-agent framework for the orchestration of emergency response processes in the hospitals of Al Ahsaa and sheds light on the main implementation challenges.

Keywords: emergency-response, agents, simulation, geospatial-preparedness, GIS

Multidimensional Assessment of E- Health Projects Sustainability

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Today e-health is considered as a promising solution to overcome deficits of health systems, and to improve quality and accessibility of care. However ICT introduce new cost structures, organizational and practice changes. They are also known to have significant environmental impacts. These impacts need to be evaluated in a multidimensional way to confirm the sustainable value of such solutions. Myriam le Goff and Robert Picard have recently developed a socioeconomic multidimensional model to evaluate technology projects: GEMSA, Grille d'Evaluation Multidisciplinaire Santé Autonomie [Multidimensional Evaluation Grid for Health and Au-tonomy] (Le Goff-Pronost and Picard, 2011). The proposed evaluation framework is based on five specific categories: strategy, technology, quality and usage, organization and economics. We propose to add environmental criteria to get a complete sustainability assessment. Indeed, due to environmental international pressure, these criteria will soon have to be

implemented in e-health projects. To define environmental criteria we have performed a transverse analysis of: i/ general environmental ICT impacts, ii/ existing eco-labels applying to ICT, iii/ techno-functional analysis of existing ongoing e-health projects, and iv/ e-health regulation in France. The result consists in a list of environmental criteria in GEMSA which take into account technology equipment and operation impacts. Project leaders can test and use them to auto-evaluate and try to minimize environmental impacts of their project - in addition to social, organizational and economic criteria. As an example, we perform an estimation of environmental impacts of a telemedicine project in obstetrics based in Nantes, France. On the one hand beneficial impacts result from avoided transport and use of paper, but on the other hand use of ICT is energy consuming. The global environmental impact is then either positive or negative, depending on previous ICT equipment rate and on area geography. To conclude, the resulting global evaluation model for e-health would be the first to include the three main dimensions of sustainable development.

Key words: e-health, sustainability, multidimensional evaluation

National Network of Teleaudiology in Clinical Practice for Cochlear Implant Patients

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To obtain hearing benefits after cochlear implantation it is crucial to optimally fit electrical stimulation parameters individually for each patient and to provide extensive hearing rehabilitation. It requires an experienced, multidisciplinary team to undertake repeated sessions with the patient in the cochlear implant (CI) clinic. For the majority of patients necessary visits require long travels from their home, associated with high cost, time, and travel weariness. To address the aforementioned problems the National Network of Teleaudiology was established in 2009, consisting of 19 cooperating centers spread around the country, with teams ready to provide medical and rehabilitation care at a satisfactory level, but lacking necessary experience to provide more sophisticated parts of the procedure. To overcome this problem, the use of telemedicine has been proposed. Experts from the CI clinic establish a teleconference connection with the patient and support specialist and use remote desktop software to access a remote computer and perform measurement and fitting - so called telefitting. This method has been assessed under controlled conditions and has been proved to be safe, reliable, and well accepted by both patients and specialists. Electrical stimulation parameters obtained during telefitting did not differ greatly from values obtained during standard, face-to-face fitting. However, assessment of day-to-day use of this technology was still missing. The aim of this paper is to present the results of a large-scale clinical introduction of telefitting, based on experiences gained during day-to-day use of the National Network of Teleaudiology. Results of study investigating real-live patients' assessment of telefitting method and proposed model of postoperative care and patients' time and money savings calculations will be presented. The development of the National Network of Teleaudiology from the stage of first scientific projects to working system covering the whole country and its components will also be described.

Keywords: teleaudiology, telemedical network, cochlear implants

New 3D Vision is the Future of the Telemedicine

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The aim of this paper is to present some ideas and result of current research oriented to using stereoscopy equipment for telemedicine. We target our preliminary tests and investigations of 3D teleconference and telepresence based on join work with physician from Medical University Sofia.

New Framework of the Regional Medical System in the Aging Society: From a View of m-Health Economics

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Due to the rapid transforming to the aging society, one of medical issues relating to the elderly is the reduction of medical expenditures, and the reforms of the current medical systems have been attempting all over the world. For this aim, patients tend to be discharged in the short period from hospital, and this raises the number of elder patients who stay and receive medical services at home. In this situation, healthcare for one elderly patient involves different stakeholders, such as physicians, nurses, public nurses, care takers, and other healthcare providers. These stakeholders as well as patients are located in the different places in the region, and they are required share medical information on the elderly. Wireless devices such as smartphones and tablet PCs, for example, have been increasing to share information in the region. Based on in-depth field surveys on medical institutions and software firms on the usage of wireless devices for patients at home with chronic diseases or cancer of the terminal stage, this paper examines how m-Health promotes efficiency of medical services, reduces costs of services and enhances QoL of such patient and family. Some clinic reported, for instance, that visiting nurses increases their total hours to spend patient's homes from 2.9 to 4.4 hours per day implying they increase their efficiency by nearly 50%. This is due to inputting data and other reports to the mobile devices, instead of writing on the paper by hand. By identifying benefits, the paper attempts to conduct the Cost/Benefit Analysis of m-Health. Although m-Health has this kind of large potentiality to solve current medical issues, there are still many obstacles for further diffusion and this paper suggests necessary deregulation on medical services and technological improvements. The former includes reimbursement of m-Health from medical insurance, while the latter standardization and common interface of m-Health equipment.

Keywords: m-Health, medical information, tablet PC,

New Skills and Knowledge Requirements for Telehealth and Telecare Staff: A UK Perspective

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The widening array of technologies associated with telehealth and telecare services means that new types and higher levels of understanding are needed by the management and operational staff of such services. Supporting these understandings are 'skills and knowledge sets' the nature of which has been explored by Coventry University on behalf of Skills for Care and Development (the government agency concerned for the skills and competencies of social care staff in the UK). The skills and knowledge sets relate to telehealth, telecare and other 'electronic assistive technologies' (EATs). These sets will, following further development and refinement, guide key

elements of telehealth and telecare service provision. This presentation explains the nature of the skills and knowledge sets and how the needs relating to these will be taken forward into a new strategic framework for workforce development.

Keywords: Telehealth, Telecare, Social Care, Skills, Knowledge

Objective Evaluation of Chronic Dysphonia Laryngeal Origin and Follow-Up of Their Treatments by the Implementation of Telemedical Device

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Assessing the quality of voice and perception of the causes of its degradation through various indices voice has always been the main concern of clinical speech pathologists. However, the voice and speech are in essence made to be heard, the subjective evaluation "listening" to "clinical ear" of the expert remains the reference face of objective assessment methods. In this paper we develop a system dedicated to the objective characterization of dysphonia chronic laryngeal origin. The purpose of this system is threefold: diagnosis, treatment and monitoring of patient. It includes a telemedical chain made up of: A hardware with a microphone and a sound card of terminal computer; A software with: a) Vocal Audacity environment for the recording of the acoustic vocal signal; b) Wamp environment for the establishment of data base on line; c) Visual BASIC environment for treatment spectro-temporal acoustic voice signal and transfer of the data under protocol TCP/IP making profitable architecture customer server supported by the component Winsock of VB in relation to the operating system Windows. For that we have designed an experimental protocol which consists of recording and archiving of the acoustic voice signals by means of the software environment Audacity which makes it possible to deliver a temporal signal under WAVE format. Our contribution consisted of the implementation, under the Visual Basic environment, of an algorithm that allows performing the analysis of a spectro-temporal acoustic voiced speech signal in this case the vowel "a" sustained for three seconds. This algorithm is provided to calculate the following characteristic indices of the acoustic voice signal: Fundamental frequency, STD, shimmer, jitter, formants, to establish their auto and inter correlation as regard to different chronic dysphonia original laryngeal. We applied this algorithm on six healthy subjects and six pathological subjects of whose four with cancer of the larynx, one with chronic laryngitis and one presenting an inflammatory polyp of the vocal cords. The results obtained show a variability of spectro-temporal characteristics between healthy and pathological subjects and prone pathological between them according to the nature of the lesion in particular with regard to spectral content evaluated by DFT-RD and the fundamental frequency F0 averaged over several frames of the voiced signal.

Keywords: Telemedicine; DFT-RD; dysphonia-laryngeal; voiced-sound; fundamental-frequency; medical informatics.

Open Innovation in Health Care: The Role of ICT

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Innovation has been placed at the heart of the new EU strategy for growth and jobs: the Europe 2020 strategy. Although not explicitly mentioned among the five ambitious goals that focus on

employment, innovation, education, poverty reduction and climate/energy, health is certainly a top priority also for the next funding period 2014-2020. Innovation is also seen as a sine qua non to improve health outcomes and effectiveness of health care delivery. In many fields, including the pharmaceuticals industry and life sciences, open innovation has become an attractive instrument to accelerate innovation and to improve the market entry success ratio of new products and procedures. In the software industry open source principles have revolutionized the market and have led to new business models and paved the way for new ecosystems like the Android smartphone operating system. Information and communication technologies (ICT) play a very important role in today's health care delivery systems. However, interoperability is still one of the major challenges and instead of overcoming fragmentation ICT often contributes to the manifestation of the current "silos of information". The reason for this is not a technical one in the first place; the main reason is a wrong business model and a system that is organized in different sectors. In the scope of the EU project HealthPort barriers for innovation in health and life sciences have been identified and a proposal for an innovation ecosystem for health economy has been developed. This ecosystem view is the foundation of the proposed innovation system for health economy and provides new insights when applied to the health care delivery system as such. In this paper we discuss the possible role of open innovation in this system and elaborate on the role of ICT in this context.

Keywords: Open Innovation, Healthcare, policy development

Opportunities in Fund-Raising and Telemedical Program Development

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The main objective of the presentation is to share experience in fundraising and preparation of telemedical program development. Several different case studies covering both rural and more developed areas will be covered.

Keywords: sustainability, finance, new program development

Optimization of Medical Decision: An Approach of Medical Decision Analysis

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Nowadays, it is recognized in most modern hospitals there are an increasing concern to measure hospital quality of care. The quality of care is focused on the characteristics of hospital production and some indicators of performance. These indicators of performance can be to decrease complication rate, morbidity, mortality and cost of care. The purpose of medical decision is to achieve a strategy that will bring the greatest benefit in minimizing risks and costs (managing care). However difficulty in decision-making, in medicine, often comes from situations of uncertainty about knowledge, facts and even the language used. Thus the decision most likely is not always the most useful to take. A decision analysis can rationalize the choice of action taking into account the random nature of the constraints. The method of decision analysis called Optimization of Medical Decision that I propose has several steps, namely: - The specification concerns the diagnostic obtained for a patient; - The indications are pathologies and problem found on a patient after a diagnosis; - The actions are therapeutics' strategies decided and chosen; assuming that there are several types of treatments; - The benefit expresses the degree of return to

normal health and it is a measure of relative satisfaction after an action taken or a treatment that followed a patient; - The risk expresses the complication or the death after an action taken or a treatment that followed a patient. - The measure of performance concerns the benefit-risk ratio of the chosen strategies and leading to optimization. The concern of this paper is an approach of an online resource for medical decision analysis. The measure of performance indicator, as stated, can be related to patients with similar indications or diseases. To do so we need a large database to assess performance. The online system proposed can provide real-time, direct and secure data that can be accessible by different devices such as iPhone and iPad. We assume that the wider sets of data available through the online system will further improve the quality of healthcare treatment.

Keywords: medical, decision, analysis, optimization, quality

Organization, Workflow and Technical Issues of Telediagnosics for School Screening for Faulty Postures and Scoliosis

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Telemedicine automatized system for diagnostics of faulty postures and scoliosis among children, adolescents, and adults and elderly was designed and developed. System allows performing three dimensional shape of the child or adolescent person's back to detect postural deformity, including scoliosis. Surface topography sagittal plane curvatures and sagittal balance is measured by presented system as well. Structured light method makes the patient's examination safe, using no ionizing radiation. Accurate surface topography is able to help the clinician to measure and monitor follow-up) the back shape and store obtained images as clouds of points. Every exam can be retrieved to trace the deformity changes if present. Three dimensional surface topography method allows for storing results recorded in digital format, and transfer electronic data for teleconsultation. Achieved image may be retrieved and interpreted remotely by the specialist. Clinically relevant parameters are calculated, based on detected landmarks in markerless method. Calculated parameters may be stored or printed as an electronic report. Obtained results can be retrieved from the secure database. The software allowing for data analysis and management remain key elements of presented 3D, telemedicine oriented system. Acknowledgement Works described in this article are part of the project NR13-0020-04/2008, which has been funded by the National Center for Research and Development with public money for science.

Keywords: school screening, posture, scoliosis, telediagnosics

Patient or Client? Who Decides in the Context of e-Health?

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e-Health applications are extensions of care receivers or health practitioners, created by organisations, governments, companies or even individuals. Each of them uses different terminologies, accordingly to their own domain. Each of them uses its own decision-making process model and a few issues pose ethical sensitivities. Attitudes regarding e-Health services are evolving, continuing to adapt to the ever changing rhythm of technology. The quality of a service

is being redefined when is provided frequently, as people's expectations are growing with every new healthcare solution promoted. Business standards are blended with healthcare standards, but some questions still remain. When, where, why are people called "patients" or "clients" and by whom? The semantics mix brings together integrative views on pervasive values of e-health. These are determined by various needs so the authors will capture representative examples, in order to identify how the two terms are perceived and differentiated. **KEYWORDS:** e-Health, decision-making process, healthcare standards, CRM , semantic integration, business ethics.

Keywords: decision-making process, healthcare standards, semantics

Perception of e-Health Services by Health Care Professionals (A Case Study of Federal Medical Centre, Imo State, Nigeria)

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Despite the vast research by Nigerians on the use of electronic health services, little is known about its perception and acceptance by health care professionals. The degree of acceptance and understanding of e-health services in health care sector is highly dependent on the perception of e-health by health care professionals. To evaluate this, a survey was carried out at Federal Medical Centre Owerri, Imo State to substantiate the level of acceptance and understanding of ehealth services.

Keywords: perception, acceptance, understanding, dependent, sector

Pharmaceutical Care Actualization through Innovative eHealth Strategies

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With changes in the dynamics of social expectation, legal/ regulatory standards, as well as healthcare service provision, there is need for the continual adoption of new practice models. Pharmaceutical care model which has been the most recent pharmacy practice model comes with higher responsibility of disease management clinical functionality which requires the pharmacist to attain a higher level of knowledge, clinical skills and independent judgement. The concept of pharmaceutical care is built around the cooperative and collaborative processes between the patient and the pharmacist in collaboration with other members of the healthcare team. Innovative technology especially ICT meant to enhance pharmaceutical care processes and programmes, reduce the frequency of Adverse Drug Reactions (ADRs) and length of hospital stay, improve care coordination, reduce overall healthcare cost and downtime are constantly developed. Electronic Pharmacy Systems (ePharmacy) can catalyse a paradigm shift from the isolated traditional model of pharmacy practice to an integrated patient-centric system which can improve healthcare promotion and disease self-management strategies. The issues highlighted and the recommendations made in this paper bring to the fore issues pertinent to the exploitation of innovative ehealth strategies and initiatives towards pharmaceutical care actualisation and overall quality improvement of pharmaceutical care systems.

Keywords: Pharmaceutical care, e-Pharmacy, Telepharmacy, ePCR

Pilot Telehealth Project Brazil-Angola: Success Factors and Perspective

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After a long period of civil war, in 2002 Angola started a new period for country reconstruction. Regarding the health system, as other African countries, Angola faced with lack of specialized medical personal and difficulties to qualify the necessary professionals. As part of the efforts to overcome these difficulties, Brazil and Angola established in 2005 the Cooperation Program PROANGOLA with the participation of the Ministry of Health of both countries, the Federal University of Minas Gerais (UFMG) and Angolan Army Forces (FAA), with the main objective to support the restructuration of the health service in Angola. As part of this program, several Angolan professionals participated in graduate courses at UFMG. In this same year, the UFMG University Hospital started its Telehealth Project, developing its own technology and systems. Presently more than one million telehealth activities have been done for 660 remote municipalities. Connecting the two initiatives, in 2011 the Brazilian research agency Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) financed a study to implement a telehealth project in Angola. To demonstrate the feasibility of telehealth, three missions in Angola were made: initially a videoconference system was installed at the Clínica do Exército in Luanda followed by a practical demonstration of telecardiology system during a Screening for Hypertension and Diabetes involving 1,396 citizens in Huambo. Finally an event to motivate the military and civil Angolan authorities in pursues the use of Information and Communication Technology to help the restructuration of the Angolan Health System. As consequence of these actions a Telehealth System is been designed by UFMG University Hospital to be implemented and operated, initially in seven municipalities, by the Angolan Army Health System in 2013.

Keywords: Angola, Telehealth Project, telecardiology

Preliminary Experience with Text-Message Reminder Service for Ambulatory Patients

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No-shows and cancelled appointments are a major source of wasted resources in the ambulatory setting. The aim of this study was to describe the patient-population with high incidence of non-appearance (NA) or cancellation and evaluate the effect of a text-message reminder service. Data from our outpatient clinic in the period 01.01.2011 – 31.11.2012 were analyzed. The text-message reminder service became available from December 2011. This service require patients to log on to their individual health- and public service profiles to register their cellphone. Since summer 2012, all patients were systematically introduced to this concept using pamphlets in their appointment letters and posters in the hospital areas. A group of students were hired to assist patients in the registration process. During the 23-months period, there was 31650 available timeslots. Six percent were registrated as NA (n= 1921) and 5% were timeslots with cancelled appointments (n=1520) . Another 5% were unbooked timeslots. The rate of actual consultations was 82% (n= 26057). The highest incidence of NA was the age group 20-25 years, with 18% NA for males and 11% for females. Generally a high rate of NA was seen in the age from 15 – 50, with a range of 8-18% for males and 5-11% for females. In jan – nov 2011 the average incidence of NA was 8 % for males and 5% for females. In jan - nov 2012 this was 7% for males and unchanged for females. In theory, a text-message reminder service could lead to a significant reduction in NA

among young adults and it might also have an effect on cancellations. However, there was no major benefit from providing a text-message reminder system in this study. This may be due to seasonal variations and the lag-effect from registration until next ambulatory appointment. It could also be caused by a low percentage of patients registering for the text-message reminder system. This on-going study showed that merely providing a text-message reminder service does not cause a major decrease in cancellations and NA in the short run. We believe that an effort to effectively implement the text-message reminder service must be also be initiated.

Keywords: Ambulatory, Outpatients, Telemedicine, Text Messaging

Proposal of a Multi-Layer Data Model for Electronic Health Care Record

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The aim of the paper is to describe a data model for medical domain that allows storing and representing signal data type, which is more and more frequently used. It is not sufficient to store measured signals in separate files but this data must be stored in structured way as other patient data enabling easier access and satisfying requirements of semantic interoperability. The motivation of this research has been to design appropriate approaches to interoperability in medicine both for the purpose of communication and for knowledge representation; and both for data, and their relationships and the treatment processes; for both categorical data and signals. Integration of the signal in the data model has been never solved in conjunction with semantic description of signals (their behavior), and integration with other inputs of common information systems. This task is becoming increasingly important with the development of new technology and services. Crucial area in this regard is the telemedicine and monitoring of the health status of a patient in home environment. Also hospital departments require increasingly clinical data integration, mainly for the purpose of clinical research. The described research has been focused on the design of data model and system architecture, in accordance with the requirements of procedural and semantic interoperability in healthcare, and considering signal linked events. The architecture is linked to existing solutions in the fields of nomenclatures and standards in health care. Its main part is the multi-layer model that contains events (acts), signals, and evaluation representing background knowledge. In the paper we describe the proposed data model allowing inclusion of signal data type without losing semantic content. We have designed the architecture, which allows defining general concept of signal leads with all necessary information, decomposition of this signal into important complexes using definition of characteristic points and derivation of new signals. This signal domain is connected to the background knowledge, represented by a set of signal type related rules.

Keywords: data model, semantic interoperability

Radiology and the Developing World

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The overall Speaker's topic involves best practices in providing radiology interpretation and imaging expertise to humanitarian medical organizations as well as physicians in the developing world. Peter Killcommons MD, CEO of Medweb, will discuss international experiences in working with medical professionals on utilizing web-based PACS, ultrasound and computed tomography, and enhancing current techniques. Dr. Killcommons will describe the equipment and methodologies and how medical personnel are trained in imaging techniques. The audience will

hear various challenges in various countries in providing imaging services, the current applications employed within these communities, and the future goals to introduce new modalities and improve the radiological services offered. As a growing number of Med-e-tel attendees know, radiology and imaging services are scarce in developing countries. But, this observation is not enough. This observation begs the question of how to resolve this scarcity and better provide radiology interpretation and imaging expertise to humanitarian medical organizations as well as physicians in developing world. Currently new web-based radiology applications and cloud-based infrastructures are being utilized by subspecialized academic radiologists, private practice radiologists, radiology residents and fellows, as well as other healthcare professionals and imaging technologists around the world in philanthropic endeavors. Dr. Killcommons will address common goals and challenges in terms of local infrastructure and education. Educational efforts in radiology reach out from many different organizations to provide much-needed training and education across the globe. Yet, many of these resources go untapped because they are not well-known outside of the individual organizations providing them. Dr. Killcommons will provide general information about international education and outreach efforts by the RSNA, ACR and subspecialty societies, as well as other medical and relief agencies. Radiological imaging has become such a part of industrialized medicine in the 21st century that people have not had to address what happens when it is not available. Radiologists perform this important work as participants on a broad interdisciplinary team. It is the pool of radiology specialists that provide the images and do interpretations, using what they have on hand. When countries lack this training, equipment, or the radiologists, these key images are not available to support vital goals in healthcare. Dr. Killcommons will provide remediation strategies via overall discussion on technology and network advances.

Keywords: Radiological imaging, Technology/network advances, Cloud-based infrastructure, Imaging techniques

Remote Quantitative Diagnostics of Radiographic Images of Osteoporotic Vertebral Fractures

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Store-and-forward telemedicine, using e-mail to send clinical data and digital images, offers a low-cost alternative for physicians to obtain second opinions from specialists. Telemedicine may be used as a suitable tool for multicenter studies. Underdiagnosis and undertreatment of vertebral fracture (VFX) is a well-known problem worldwide. Scout CT lateral radiographs were found as diagnostic images suitable for the detection of osteoporotic vertebral fractures. Semi-automated quantitative vertebral morphometric measurements was developed to facilitate identification of VFX. CT scouts of 252 patients suffering osteoporosis and with or without vertebral fractures were used for this study. Tiff images were converted from digital source of the PACS system. Tiff files of CT scouts were sent over the email. An average email transmission time for every 10 images was less than 1 minute. The method requires less time than conventional morphometry. Lossless TIFF image format was used for analyses. Semi-automated quantitative vertebral morphometry based on shape-based statistical modeling (SpineAnalyzer, Optasia Medical, Cheadle, UK) was utilized in this study. In the literature, reliability was found excellent for vertebral height measurements, good for height ratios, and comparable to semi-quantitative grading by radiologists for identification of vertebral fractures. This study confirmed the usability of the simple semi-automated quantitative vertebral morphometric measurements from CT lateral scout views for semi quantitative teleconsultation for the remote diagnosis of vertebral fractures, and may provide further facilitation of VFX assessment. Acknowledgement This study is supported by project funded by National Science Center N404 695940

Keywords: osteoporosis, vertebral fractures, telediagnosics

Results of Trans-Telephonic ECG Monitoring Using Episodic Recorder in Different Clinical Indications

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Aims: The study investigated efficacy of longer-term ECG monitoring using episodic recorder with automatic detection in patients with less frequent symptoms. **Methods:** In the year 2010, 376 patients had 383 examinations for syncope (6%), presyncope (7%), palpitations generally (37%), palpitations with supraventricular arrhythmia (SA) suspicion (13%), dyspnea (1%), and as check-up after atrial fibrillation (AF) ablation (36%). **Results:** There were 84753 ECG recordings analyzed (221± 380 recordings/1 monitoring period of 14.6 ± 8.8 days). Diagnosis was obvious on 18464 recordings in 91 (24%) patients. In the categories of syncope, presyncope, palpitations and suspect SA, the finding led directly to diagnosis in 5 (21%), 9 (36%), 17 (12%), and 25 (50%) patients, respectively. Conversely, at the time of symptoms, mere sinus rhythm possibly with premature beats or sinus tachycardia was found in 9 (38%), 9 (36%), 56 (41%), and 5 (14%) patients, respectively. After prior AF ablation, AF/atrial tachycardia recurrence was revealed in 35 (26%) patients (of whom asymptomatic in 17 (49%) patients). **Conclusion:** ECG monitoring with automatic ECG detection directly facilitated subsequent therapy in 24% of patients and excluded serious arrhythmia in another in 33% patients with indications other than check-ups after ablation. Non-invasive monitoring should precede invasive diagnostics particularly in patients with syncope, presyncope, and palpitations without structural heart disease. The work was supported by grant IGA MZ NS10261-3/2009.

Keywords: trans-telephonic ECG, arrhythmias, cardiology

Safety Analysis of a Remote Patient Monitoring System with a Guideline Based Decision Support

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Home Telehealth systems are used to help in the management of chronic conditions by the patients themselves. The reliable, efficient, and individualized care for such patients requires effective process management and mechanisms to ensure safety that can be achievable only with the application of effective safety analysis to home Telehealth approaches. This paper proposes a new technical approach to analyse the safety of clinical workflows in Telehealth environments and applies it to a Guideline-Based Decision Support System (GBDSS) for generating referral recommendations from routinely recorded home Telehealth data. GBDSS are considered as high risk systems given that providing wrong recommendations to patients might cause serious harm; so, this study analyses such safety critical systems in order to find hazards which can potentially cause accidents. Hierarchically-Performed Hazard Origin and Propagation Studies (HiP-HOPS) is a state-of-the-art technique which has been prominently used in mechanical systems to effectively identify weakness points in the system design as it automatically synthesizes and analyses fault trees and Failure Mode Effect Analyses (FMEA). The paper explains how HiP-HOPS can be used to analyse the workflow within a home monitoring system where GBDSS is used to give recommendations for patients with Chronic Obstructive Pulmonary Disease (COPD). The results of using HiP-HOPS include the root causes of system failures which may lead to dangerous

situations where patients' lives are at risk. Initial study of this approach shows that it has the potential to improve safety of Telehealth applications as it can be used to analyse workflows of these applications; moreover, it can be used to analyse any clinical workflow. Furthermore, the paper makes the case that this approach is generic and can be used to analyse the impact of software, hardware, as well as human failures in a Telehealth application environment.

Keywords: Safety Analysis, Clinical Workflows, Telehealth.

Safety of Telephone Treatment Protocols in a Primary Care Practice

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Background: Increased demand on health systems due to increasing patient age, obesity, and high medical complexity coupled with shortage of primary care providers has created an urgent need to find alternatives to office visits for common conditions seen in primary care. Our aim was to study the quality and safety of telephone treatment protocols in a primary care setting.

Methods: This was a retrospective review of electronic medical record and administrative data. We examined 4 telephone treatment protocols - uncomplicated urinary tract infections (UTI), Candida vaginitis, pharyngitis and sinusitis. Outcomes measured were death, hospitalizations, emergency department and outpatient visits within a 30 day period after the initial call.

Results: There were 86,131 symptom related telephone calls in the study period from 2008 to 2010. 12,147 calls fulfilled the criteria for telephone triage for UTI, sinusitis, Candida vaginitis or pharyngitis. Among these 8,066 were offered prescription treatment and 410 were advised supportive home care measures without a face to face visit. In the following 30 days there were 26 inpatient and 191 observation hospitalizations and 233 patients were seen in the emergency department. Hospitalizations could potentially be related to the call symptom in 8 patients, were undetermined in 21 and clearly unrelated in the remaining. There was one death in the 30 day period which was unrelated to the call symptom.

Conclusions: In our practice nearly 70% of 12,147 phone calls meeting the criteria for telephone triage protocols for four common conditions could be treated either with a prescription medication or supportive home measures without a face to face visit. Of these, 0.09% (8/8476) had hospital admissions in the 30 days following that could possibly be related to the symptom phone call. A great proportion of symptom calls for UTI, Candida vaginitis, sinusitis and pharyngitis can be appropriately triaged telephonically and the incidence of 30 day hospitalization and emergency department visits following telephonic treatment is low.

Keywords: Telephone treatment protocol, primary care

Security and Privacy Issues for enabling the Secondary use of EHRs in Clinical Research

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Re-using Electronic Healthcare Records (EHR) for facilitating clinical research studies has a great potential. Besides interoperability, safeguarding the security and privacy of the medical data in the context of secondary use for clinical research is one of the most important challenges in this respect. In order to ensure that the clinical information is shared among EHR systems and clinical research systems in an ethical and safe way, there needs to be standards-based and adaptable security and privacy mechanisms that can be used by both clinical care and clinical research parties in an interoperable manner. In this respect, we aim to develop an extensible security infrastructure that supports re-use of the EHRs represented in the HL7 Clinical Document

Architecture (CDA) format for strengthening the post-approval drug safety studies in the area of clinical research. Our work involves implementation of the security architecture, including novel data protection mechanisms applied to the queried clinical instances represented in CDA as well as additional security services compatible with standard profiles that guarantees the safe use of EHRs for the clinical research studies.

Keywords: De-identification, pseudonymization, anonymization, secondary-use-of-EHRs, HL7-CDA

Semantic Intelligence Interfaces for Ambient Assisted Living

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The development of semantic intelligence interfaces capable of extracting data from speeches and converting structured texts into voice will be the next paradigm of intelligent interfaces for ambient assisted living (AAL). Nowadays some of these devices like touchpads have microphones and speakers. So we have another type of interface that could use voice to communicate on both directions. The usage of microphones as an interface with the software applications has a great advantage of not having the constraints of using the hands to communicate with the device. This will improve the accessibility and ubiquity of the solution and could also improve its efficiency and effectiveness. Sometimes this could be crucial for our propose if for instance the user is unable to reach the mobile device or if the user cannot use the hands. There are some devices that use voice commands to trigger some actions. The cell phones contact lists can be an example of that. However if the user is reporting a situation like for example if a nurse is assisting a patient and is reporting the nursing interventions the system must have the intelligence to recognize the speech, translate it into text and then retrieve information from the text. There are some libraries with application programming interfaces for different platforms that can be integrated to acquire voice speech and convert it into text. Our main aim is to convert free text into structured expressions and to convert these expressions in normalized terms. We intend to use intelligent agents to achieve this goal. This study explores some methodologies and techniques of extracting expressions and relating them with normalized terms and ontologies. With these techniques it will be possible to promote better systems to promote AAL, conducting epidemiologic studies and increase the patients' safety.

Keywords: interfaces, semantic, AAL, intelligence, ontologies

Smart Knee Guard: A Knee guard which warns harmful physical stresses on the knees

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SKG captures thermal pattern (image) of the knees continuously with a novel wearable thermography system which is installed in the knee guards. Images are sent wirelessly to the user's smartphone or a remote power computer. Different image processing algorithms including those which are used in standard thermography as well as newly developed statistical algorithms are applied on the images to detect harmful physical stresses on the knees and warn the user to prevent severe knee problems in their early stages.

Due to the vulnerability of the knees, everybody especially the obese people may face knee problems during everyday life, biking, running, rehabilitation or carrying heavy objects. But the main potential users of SKG are in sport domain; athletes and racehorses. Especially during

competition season, regular checks are usually neglected. Thus common knee problems like overuse or internal injuries are detected by feeling pain. But pain is sensed after advances in the abnormality, is not an accurate metric and depends on the user's tolerance. So in most cases, such problems lead to interruption or at least decreasing of the efficiency of athletes. SKG is worn by athletes and sense the knees' situation continuously and without any unpleasant effect and warn problematic situations in their early stage.

In the current design, the user's smartphone is acting as both processor and user interface. But for those who do not have appropriated cellphones, SKG is applicable as well. The cellphone connects to the knee guards via Bluetooth, aggregates thermal data and sends it to a remote processor in form of SMS messages. After processing, short SMS feedbacks are sent back to the user's cellphone. Or in case of wireless internet access, SKG knee guards send their data directly over internet to a remote processor. A small buzzer on the knee guards warns the user and further information is emailed to the user. SKG provides standard thermography images and statistical analyses as well. Optionally, user can allow data to automatically forward to a physician to check the images as well.

Social Aspects of a Telemedicine

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In Russia more than 620 Telemedical centers function. Modern telemedical projects are submitted not only as the center-pereferiynye regions, but also intra regional projects of various level, for example regional hospital - areas. Consultation of patients at all stages of diagnostic process by specialists of the Federal medical centers, use of mobile telemedical means in field conditions and emergency situations, rendering emergency medical care to victims, including in the defeat center - here the incomplete list of socially significant directions of a telemedicine in health care. The most important social problem of a telemedicine is not only ensuring availability of highly skilled medical care to the population, regardless of a social status and a territorial arrangement, but also quality of its granting at the expense of diagnostics improvement. There was an opportunity to get advice of the profile expert, to conduct dynamic supervision without leaving the region. In a consequence, it allows to use considerably a telemedicine as the instrument of prevention of diseases, to lower an incidence, disability and mortality of inhabitants of Russia and as to optimize financial expenses in health system. Telemedical consultations are the extremely demanded owing to, a dissatisfaction with level of the medical care available in a residence of patients, and difficulty in receiving the advisory help in the Federal medical centers, in view of the economic and social reasons. The prospect of development seems through further expansion of a telemedical network, creation of administrative structure at Ministry of Health of the Russian Federation, development of a package of the normative documents regulating work of the telemedical centers, development and implementation of interdepartmental programs of informatization of regions participation of branch governing bodies, the scientific and production organizations, business concerns, the enterprises and establishments of social value.

Keywords: telemedicine, health, medicine, modern, technologies

Space Medicine, Telemedical Ecology and Telemedicine: Prospects for Cooperation and Development

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Great attention has always been paid in space medicine to implementing of its discoveries on the Earth. Actually, the past experience of medical and physiological investigations in space clearly shows that the main challenges for the future of medicine in space as well as on Earth are prevention, individualization and telecare. Prenosological principles of diagnosis, developed in the concept of "adaptation risks", are successfully applied in space to assess the health of cosmonauts, to identify functional states, border between health and disease. Space medicine has also had a lot of experience in individual health assessment of cosmonauts and characteristics of their adaptation. The objects of telemedicine usually are patients with various diseases, telemedicine study of healthy people practically is not provided. A large complex of medical information on healthy people was transferred from around the world to Moscow via Internet in the satellite project "Mars-500" for the first time. This new methodology of distance investigation of environmental influence on health initiated a new scientific and practical direction - a telemedical ecology. According to the results of previous studies, the disorders of adaptation and appearance of prenosological functional states correlate with ecological factors, changes in loads, variations in weather and reducing of self-reported health status. It was also demonstrated the benefit of weekly individual studies compared with the monthly group tests. This experience has allowed to start a developing of new system to meet the challenges of preventive medicine - telemedicine systems for prenosological individual control. The "Heart Wizard - Mars-500" instrument which was created as a result of cooperation between the Institute of Biomedical Problems and the American company Biocom Technologies for use in long-term medical and environmental studies in Canadian and American participants, is a prototype of these new systems. The new Russian-Canadian-American system Delta for individual prenosological control with using the evaluation criteria on human health, developed in space medicine, is developed now on the basis of this instrument.

Keywords: health assesment, ecology, individual health

Specialties and Topics Required in Teleconsultings: Telehealth Brazil Network Core's Report in Mato Grosso Do Sul, Brazil

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Telehealth Brazil Networks Program in Mato Grosso do Sul (MS) began operations in 2010 and has always sought to contemplate its two major components: the teleassistance and tele-education in order to enhance Family Health (FH) professionals performance, which is the choice strategy for Primary Health Care in Brazil. This work intends to present the asynchronous teleconsultings monitoring from MS Core, which have been contributing to the solvability expansion of Family Health teams and serving as a basis for choicing Tele-education activities, highlighting the most recurrent specialties and the themes. The information survey was conducted from the teleassistance system database used by the program in MS, from July 2011 to November 2012. The MS Core teleassistance system presented on 30 November 2012, as potential applicants, 1495 health professionals registered, being 490 community health workers, 127 physicians, 382 nurses, 142 dentists, 44 oral health assistants, 166 nursing technical/assistant and 144 others, including local program coordinators, team members of Family Health Support Cores, directors / managers Health Unit, pharmacists, health surveillance servers, administrative assistants between others. These professionals are distributed in 73 of the 78 state counties (93.6%). By November 2012, 205 doubts were required that generated 319 teleconsultings on the system, being the most demanded specialties in descending order: public health nursing (26.12%), family and community medicine (14.28%), gynecology (13.06%), obstetrics (8.97%), cardiology and dentistry in family health (6.12% each). With lower percentages appear: pediatrics, pulmonary medicine, dentistry, psychiatry, endocrinology, general and vascular surgery and neurology. The most recurrent

themes were family health working process doubts, general medical guidelines; vaccines; hypertension; dressings, skin diseases, protocols, tuberculosis, heart failure, drugs, among others. Therefore, the asynchronous teleconsulting has been shown as a new health assistential device, leveraging the intervention, increasing the resolution, and enabling integration between different levels of health care.

Keywords: Telehealth, Primary Health Care, Teleassistance

Speeding up the Content-Based Image Retrieval of Lung Nodules in the BigData Age

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The volume of data produced in medical centers has increasing fast. The annual production of the big radiology centers is about 10 Terabytes. This situation exists due to the ease that the data of the patients are obtained and stored, resulting mainly from the reduction of the cost of the equipments during the last years. The Content-Based Image Retrieval (CBIR) has received great attention in the medical community because it is capable of retrieving similar images that have known pathologies. However, the sheer volume of images produced in radiology centers has precluded the use of CBIR in the daily routine of hospitals. Therefore, we have reached to an unprecedented age of “BigData” and it has been motivating research and companies to find new solutions. The Grid Computing (GC) technology represent one of the most recent and promising tool in distributed computing. GC is the integration of many computers distributed geographically, making it possible to create a virtual computing platform, giving to users and institutions a virtually unlimited capacity to solve problems related to the storage and access of data, and also to process applications with high computational costs. Techniques focused on the medical image retrieval are a major beneficiary of the GC technology due to their characteristics and necessities: high processing and large storage. This paper presents a Bag-of-Task GC approach to speed up the images retrieval of lung nodules stored in a big medical images database. This solution combines Texture Attributes and Registration Algorithms (RA) that together were capable of retrieving images of benign lung nodules with greater-than-72% precision and greater-than-67% in malignant cases, yet running in a few minutes over the GC. Moreover, we concluded that GC is a low cost solution and suitable for public hospitals and small clinics in development countries, because, it is able to use the idle recourses of computers.

Keywords: CBIR, CAD, Grid Computing, Cancer

Supporting Healthy Aging with Shared Self-Prevention E-Health Stations

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The challenge related to the ageing carries a significant impact on the burden of health and social care. This is especially concerned with a relatively high rate of chronic diseases incidence in the elderly population. Extended prevention actions are therefore recommended to improve the quality of life of the elderly and neglect the effect of chronic diseases on the economical efficiency of public healthcare systems. At the same time several studies show that e-care interventions allow for primary and secondary prevention in such areas as cardiovascular or metabolic diseases. The article aims to discuss the concept of establishing a self-prevention e-health station shared by a community of the elderly persons grouped around a day care facility. This station is built with the use of personal medical devices such as a blood pressure monitor, scales with a body analyzer, a pulse oximeter and a spirometer, connected to a touch screen

personal computer. The application running on the computer guides the user through the process of self-measurement, allows to automatically evaluate the results and store them in a remote PHR repository, as well as connect other personal medical devices such as glucometers. The station is installed on the premises of a day care facility and is shared by a group of elderly, thus enabling cost-efficient prevention without the need of direct involvement of medical personnel. The shared self-prevention e-Health station is one of several application scenarios planned as part of the pilot action conducted by Poznań Supercomputing and Networking Center within the HELPS project supported through the Central Europe programme. This pilot action is aimed at creating an ambient assisted living environment based on an open source AAL platform (universAAL) and state-of-the-art equipment enabling to maintain personal smart spaces. The developed environment will be immersed in real homes of end beneficiaries – elderly and disabled – and is foreseen to serve as both: a living laboratory of specialized AAL and e-Health services, and a platform to provide support to those cared for by formal and informal carers within public and non-profit care formats.

Keywords: self-prevention, e-health station, AAL

Sustainable 24/7 Rural Healthcare with Eco Conservation

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Telemed-Touch (c) is a unique program that is a symbiosis of a healthcare person's caring touch and cutting edge healthcare technology. We propose a low cost, globally sustainable, end-to-end primary and preventive rural healthcare program that applies force multiplier methodologies to fuse responsive and responsible rural healthcare with eco-conservation.

Keywords: rural, healthcare, eco-conservation, touch-and-feel, telehealth

Tailored Patient Information Using a Database System: Increasing Patient Compliance in a Day Surgery Setting

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Patient compliance is key to successful treatment of patients in day surgery. Noncompliance can put the patient at risk and is costly. To increase patient compliance, patient empowerment is essential. Patients having day surgery are responsible for preparing them self for surgery and postoperative rehabilitation. The hospital is responsible of providing the patients with accurate information enabling the patient to prepare for surgery. Often patients are overloaded with uncoordinated information, letters and leaflets. The contribution of this project is a database system enabling health professionals to empower patients through tailored individualized information. Performing 6500 operations per year at our Day Surgery Centre, health professionals need a computer based system to create individualized information material. Health professionals must be able to adapt the information material quickly to the type of anaesthetics, surgery, fasting regimes, etc., for each patient scenario. The material must have a professional look and should be provided in a language native to the patient. Finally it is a requirement to document what information material has been handed out. A 3-tier software architecture was established to support these requirements. A relational database system holds all information pieces in a granular, structured form. Each individual piece of information can be joined with other pieces thus supporting the tailoring of information. A web service layer caters for integration with output

systems/media (word processing engines, web, mobile apps, and information kiosks). To lower the adoption bar of the system, an MS Word user interface was integrated with the web service layer, and information can now quickly be categorized and grouped according to purpose of use, users can quickly setup information letter templates, generate information material based on existing templates and support translation of content. Statistics on compliance taken prior to system introduction will be compared to post-system introduction statistics to confirm that the novelty of the system efficiently supports the requirements. Sponsored by TrygFonden, supervised by DELTA.

Keywords: Compliance, Nursing Informatics, Daysurgery, Database

Teleconsultation Service to Improve Access to Specialized Care in Physiotherapy: The Experience of the Telehealth Network of Minas Gerais, Brazil

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Introduction: The Telehealth is an important strategy to provide support to health professionals in primary care in small cities by teleconsultation in all fields of health, including physiotherapy. It constitutes an example of successful perennial use of Telemedicine in the Brazilian Public Healthcare System (SUS).

Objectives: To analyze the teleconsultations in physiotherapy performed by the Telehealth Network of Minas Gerais, Brazil. **Methodology:** All teleconsultations in physiotherapy performed by Telehealth Network of Minas Gerais from January to December 2011 were assessed regarding the requesting professional, type of doubt, specialist who answered the teleconsultation and level of assistance.

Results: During the study period, 233 teleconsultations in physiotherapy were performed; 74.7% of them were related to assistance of a particular patient, 23.2% were educational and 2.1% were about professional regulation. Regarding the requesting professional, 76.8% were physiotherapists, 17.6% were nurses and 2.6% were physicians. Physiotherapists specialized in trauma and orthopedics (48.1%), neurology (17.2%) and pediatrics (12.2%) answered the majority of teleconsultations. Regarding the type of doubt, 88.4% were about treatment, 3.9% diagnosis and 3.9% orthosis and prosthesis. The most frequent level of assistance was ambulatory (96.0%), and home care and hospital represented, respectively, 3.1 and 0.9%. Of the 607 municipalities which are attended by the service, 80 (13.2%) requested teleconsultations in physiotherapy during the study period; 83.8% of them had less than 10,000 inhabitants.

Discussion: The concentration of resources and specialized healthcare in the bigger cities is a well-known phenomenon. This study illustrates the role of telehealth in providing support to the primary care practitioners of small and remote municipalities. As expected, the most frequent level of assistance was ambulatory and the majority of municipalities had less than 10,000 inhabitants.

Conclusion: In conclusion, most of the teleconsultations in physiotherapy in our service are doubts of physiotherapists related to outpatient care in trauma and orthopedics, of municipalities with less than 10,000 inhabitants.

Keywords: Telehealth, Physiotherapy, Primary Care

Teleconsulting Inserted in a Moodle Platform. The Experience of UERJ Nucleus of Brazilian Telehealth Networks

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Background: 30,010 health professionals, with graduation or high school levels, are registered at the Moodle platform of UERJ Telehealth Center. They are from all the Brazilian states. These professionals take part in events through teleconference and distance online courses. Under this background, in 2010, the system of teleconsulting in Brazil (SIATES) was integrated to Moodle, in order to make easier the access of the users (that now have got a single register and login) to both systems. Methodology: Moodle is the acronym for "Modular Object-Oriented Dynamic Learning Environment", e.g., an open software of support to learning in a virtual environment. SIATES is a system developed by UERJ Telehealth Center staff. It enables health professionals registered at Moodle to send doubts (clinical or general ones) for a second opinion of a specialized multiprofessional staff. At the page "entrar.php" do Moodle some parameters took from the page "config.php" were applied, making possible to recover information from the active session of the user. So, when the user, logged in Moodle, accesses SIATES, some of his data, as ID and CPF(Brazilian acronym for Taxpayer Identification Number) are saved by the system and compared with SIATES data bank. In case the user already exists in SIATES and his data are updated, the system is going to authenticate it automatically and fairly. If the user is not registered in SIATES, the Moodle routine of "entrar.php" automatically makes the register based in the data recovered from Moodle, and then proceeds to the user's authentication. Results: After this integration, an expressive increase of 57% in the number of users registered at SIATES was verified, in comparison to the former period of integration, which was of 25%; a dramatic decrease in the quantity of support requests for register or assessment to the systems was also observed. Conclusion: Based in the outcomes reached, it is possible to conclude that the integration of the systems acted as a facilitating agent to the user in health, fulfilling, thus, the aim of the present study.

Keywords: teleducation, teleconsultation, telehealth

Tele dermatology: The Experience of a Telehealth Service in Brazil

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INTRODUCTION: Dermatology diagnosis has a strong visual component, which makes it a good specialty for the use of telemedicine. Tele dermatology can be especially useful in isolated cities with limited access to a specialist. In a country with the proportions of Brazil, where healthcare professionals are unevenly distributed, this scenario becomes much more important. The Telehealth Network of Minas Gerais is a public telehealth service which attends 658 of the 853 municipalities of the state of Minas Gerais, Brazil, by performing teleconsultations and tele-electrocardiography. This study has the objective to report the experience of this service in the field of tele dermatology.

METHODS: All teleconsultations performed by the Telehealth Network of Minas Gerais until August 31 of 2012 were evaluated. Of those, the ones performed from January 2010 to May 2010 were deeply analysed regarding the types of doubt to serve as an example of the total.

RESULTS: During the study period, 8,724 teleconsultations in dermatology were performed, which represents 20% of the total (n=43,429), making dermatology the most frequently requested subspecialty. The majority of the doubts were sent by nurses (58%), followed by physicians (39%). Thirty-nine percent of the teleconsultations came from municipalities with less than 5,000 inhabitants. The analysis of the teleconsultations submitted from January to May 2010 (n=413) revealed that the majority of them were related to the assistance of a particular patient (93%) when compared to educational questions (7%). The most frequently asked questions were about pharmacological treatment (68%) and etiology (60%).

CONCLUSION: Tele dermatology is the most frequently requested subspecialty in of the Telehealth Network of Minas Gerais. That can be explained by the lack of specialists in small and remote municipalities of the state, as well as the difficulty of the primary care physicians to manage skin diseases.

Keywords: dermatology, telemedicine, teleconsultation

Telediagnostic Software for a Spinal Curvature Measurement and Vertebral Fractures Classification with Remote Database

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Spinal deformities and vertebral fracture are the common types of spine pathology associated with a significant increase in disability morbidity, and deterioration of the quality of life. Classifications and semiquantitative assessment enhance the diagnosis, treatment decision making and follow-up. The aim of the study was to design and develop an application to facilitate and speed up the assessment of the spine. The program focus on three main areas: spinal curvature measurement, vertebrae fracture classifications and gathering data for further research from several surveys. User is allowed to store and download all necessary patient data through the Internet. The application enables user to measure the curvature of a spine using Cobb and/or Centroid method. System for classification of spine fractures was implemented into presented application. Several tools were integrated to enhance telediagnosics for radiologists and clinicians, namely: precise angular measurements, zooming images, automation of the calculation process, contrast adjustment, and few more. During evaluation, simultaneous, constant preview of an X-ray and fracture reference pattern is available. The database system can operate either on-line or locally that enables to store and retrieve data over the Internet. For the clinical purposes the application was integrated with online survey service, allowing the user to utilize spine disorders questionnaires. The application was additionally equipped with an advanced search engine and statistical tools. The program was designed to be fully compatible with DICOM standard, so both importing and exporting information from DICOM is possible. Data can be also entirely anonymized (both DICOM tags and patient info burned in image data) in case of, e.g., preventing privacy infringement. The series of digital radiograms were successfully evaluated and measured in the pilot study.

Keywords: telediagnosics, spine, deformity, fracture, DICOM

Telehealth and Person-centered Care: Exploring the Possibilities

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eHealth, the application of information and communication technologies (ICT) to healthcare recipients across multiple settings and environments presents opportunities on an impressive scale. Telehealth provides health information and services over distances, mediated by ICT. Countless specialties are using telehealth technologies and strategies today. Person-centered care, in which provider and recipient are in true partnership, is said to be of, for, by and with the care recipient. Key principles of person-centered care include respect for the patient as a person and appropriate responses not only to the person's immediate physical and psychological health needs,

but also to the person's emotional, social and spiritual needs, which may or may not be directly related to health needs. A holistic focus on the person has great potential as a guiding force in telehealth, even with its incredible array of modalities from remote microsurgeries to public health kiosks. Ensuring the full spectrum of care, education and self-care capabilities with people in clinical settings, homes or communities using telehealth technology and strategies may decrease costs and improve healthcare quality and access. But it is necessary to promote the concept that a person with health care needs is a full participant in care decisions and delivery, and to expect that telehealth providers and researchers are themselves committed to dealing with the totality of every person. The purpose of this paper is to describe an analysis of methods used in telehealth research involving people with severe and persistent or chronic illness for evidence that the principles of person-centered care were applied in subject recruitment and subsequent interventions, and to identify principles by which researchers can integrate person-centered care approaches. The phrase 'research subjects who meet study criteria' may need reconceptualization to mean fully collaborating persons who decide to be available to test interventions from which they or others could benefit.

Keywords: person-centered care, telehealth, telehealth research

Telehealth Brazil Networks and Telenursing: Experience Report from Mato Grosso Do Sul Core, Brazil

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This abstract presents the telenursing actions developed in Mato Grosso do Sul Core from Telehealth Brazil Networks in 2012. Between teleassistance and teleducation available services, there was a growing trend in telenursing of asynchronous teleconsulting usage and participation in permanent health education actions this year. Among the registered professionals in the teleconsulting system, 395 are nurses (25.95%), 166 are nursing assistants or technicians (10.86%) and 494 are community health workers (32,33%). Together, this professionals group represents 69.14% from the registered ones. Until December 2012 were performed 27 asynchronous teleconsultings in telenursing. The more frequent questions in telenursing were about wound treatment and follow-up of these cases, the work process and the nursing role in Family Health Strategy (FHS), the community health workers role, user embracement and nursing consultation. The teleducation activities offered during this period had prior consultation of these professionals as well to suggest topics as the best schedules. Webconferences were conducted with the following subjects: healing and cleansing wounds, cleaning wounds and covers, newborn care in Primary Health Care (PHC), nursing care in dengue, tuberculosis, hypertension, diabetes mellitus, woman health and FHS work process. And about the teleducation activities participant's profile, it can be said that the majority are nurses and community health workers. Therefore, Telenursing actions in Mato Grosso do Sul has been shown as an important tool to support technical assistance, increasing access for professionals to permanent health education actions of, encouraging interaction and feedback between professionals and the team from Telehealth Core. Besides, it can avoid unnecessary geographic displacement and negative impact on professional working schedules in health units, as well as it can contribute to complete care assurance by encouraging the cases routing that need other health care levels, establishing FHS/HPC as the health care coordinator and network ordinator and stimulating health care practices based on the best available evidences.

Keywords: Telehealth Brazil Networks, Teleducation, Telenursing

Telehealth Brazil Networks in Mato Grosso do Sul, Brazil: Deployment Program Experience in Health State Department

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This summary describes the Scientific and Technical Center deploying experience from Telehealth Brazil Networks in Mato Grosso do Sul, based on the Health State Department (SES-MS), a process initiated in second half of 2009, with the Working Plan of Mato Grosso do Sul, financed for 24 months, from July 2010, by an Agreement Charter with the Pan American Health Organization (PAHO). Currently, it has been continued funding through an ordinance linked to the Primary Care Department / Brazil Health Ministry and SES-MS resources. The great advantage of this deployment was that the movement had started in SES-MS, once in the pilot cores it happened in the universities with Telemedicine and Telehealth experience. Various project stakeholders gathered, and the National Education and Research Network (RNP), through the Telemedicine University Network (RUTE) Coordination was also important external partner. In 2010, SES-MS management decided to include in its chart a new State Coordination - the Telehealth one (CETEL) - linked to the Strategic Management Directorship, which has been essential to the project sustainability. All state cities received an equipment kit for installation in one of its family health units. However, regardless of kit receipt, all units can have their teams registered in the teleassistance system. The state has 486 health family teams and 1495 professionals registered in the teleassistance system, distributed in 73 of the 78 cities, and this number is growing. Since July 2011, 319 responses were given to teleconsultancies, and 297 in 2012. It were made 41 webconferences, recorded and available on the site. Strategies were used to increase the services usage in 2012: 3 State Meetings, 3 Regional Meetings and trainings. Besides, there have been used social media such as Twitter and Facebook, in addition to two editions of a house organ. Among the challenges are the teleassistance system consolidation as a real support to the Family Health Teams, as well! as the supply and access expansion of teleassistance and tele-education actions, strengthening primary health care as care coordinating and health care network ordering in Mato Grosso do Sul.

Keywords: Primary Health Care, Telehealth Management

Telehealth Brazil Networks Program and Teledentistry: Experience Report of Mato Grosso Do Sul, Brazil

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The Telehealth Brazil Networks Program uses information and communication technologies to promote teleassistance and tele-education, with a focus on Primary Health Care qualification, which is represented in Brazil by Family Health Strategy. The state of Mato Grosso do Sul (MS) is part of this network since 2010, and its core works within the Health State Department. This abstract presents the Dentistry actions in the MS Core in 2012. It was done a consolidated document from teleconsultings registered and tele-education data executed by the core, linked to oral health. There are 1529 registered health professionals in the Teleassistance System (donated by Clinics Hospital, from Federal University of Minas Gerais / HC-UFGM), being 143 dentists and 41 oral health auxiliars. There are two teleconsulting dentists, an expert in family health and other in dentistry for patients with special needs and pediatric dentistry. Till November 2012, 205 doubts were registered that generated 319 teleconsultancies in the Teleassistance System, with 20 of these in dentistry, which generated 44 teleconsultancies, on topics such as: dentistry work

process within family health, mouth and face diagnostic changes, drugs use, fluoride toxicology, periodontal disease management in patients with diabetes, among others. There are still medical doubts concerning to oral health, and even a case that, from photos attached to the system, provided support for the differential diagnosis of sarcoidosis and neoplasia in the upper lip. In tele-education, were conducted 42 webconferences, 8 of them being related to oral health, with the following themes: Oral Health in Family Health Strategy, The Home Visit in Oral Health, Oral Health and Hypertension, Diabetes and Oral Health, Oral Health Indicators in the National Improving Access and Quality of Primary Care Program, Baby Oral Health, Dental Specialty Center and Regional Laboratory of Prosthodontics. The Teledentistry has been shown as an important tool for health care and educational support to Oral Health professionals in Primary Care in MS, with the prospect of expanding these services.

Keywords: Dentistry, Teledentistry, Teleconsulting, Tele-education

Telehealth in Post Conflict Zones: Six Year Findings from a Cross Border eHealth Program

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The history of the past 30 years in Afghanistan is one of prolonged conflict, social unrest, political instability and large scale internal and external migration. The health system due the armed conflict was hit badly resulting in issues concerning poor access to and quality healthcare to afghan population. It is widely accepted that the use of Information and Communication technology in healthcare (eHealth) services can act as a catalyst for the improving quality of life for people in the rural and remote areas. eHealth in Afghanistan has proved a beacon of hope in providing quality health services to rural population of Afghanistan. Aga Khan Development Network (AKDN) recognizes the role eHealth can play in bringing together different institutions and providers in the Central Asia region, providing coordinated care to the population, ensuring a continuum of care at all levels, and minimizing the barriers of distance and time. This current study reports a model of eHealth activities at the French Medical Institute of Children, (an Aga Khan University managed hospital in Afghanistan) and Aga Khan Health Services Afghanistan managed hospitals in Bamyan and Faizabad, which has successfully completed 6th year of its operation. More than 7000 patients have benefited from this technology, with more than 4000 live teleconsultations and 3000 store and forward teleconsultations. Through elearning sessions, more than 2000 staff in the rural hospitals of Bamyan and Faizabad have benefited. On average the patients have saved 200 USD and 4-5 days of travel time. Recently, Khorog Oblast General Hospital in Tajikistan was connected via eHealth to FMIC-Kabul. The study summarizes six years of eHealth services and also gives future role eHealth will play towards an integrated Central Asia eHealth system for AKDN.

Keywords: eHealth, Afghanistan, Pakistan, Central Asia

Telehealth to Provide Support for Healthcare Practitioners in Situations of Floods: A Brazilian Experience

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Introduction: Natural disasters are any event of nature with catastrophic consequences and great impact on society. Telehealth may be used to provide support for public health in situations such as natural disasters, but there is lack of evidence regarding telehealth support in cases of floods. The objective of this study is to report examples of the use of telehealth in the assistance of healthcare professionals in situations of floods. **Methods:** The Telehealth Network of Minas Gerais is a Brazilian public telehealth service which connects specialists from university hospitals with primary healthcare professionals of 658 municipalities of the state of Minas Gerais, and support these healthcare professionals by providing tele-assistance through teleconsultations and tele-electrocardiography. All consecutive teleconsultations from December 16th 2011 to January 31st 2012 (the period of the highest concentration of rainfall in the state) were analyzed, and those ones related to floods were reported. **Results:** A total of 1826 teleconsultations were analyzed. Only 3 of them were related to floods, 2 were educational and 1 was for health assistance. One educational teleconsultation was about a local physician who wanted guidance to investigate a surge of diarrhea associated to the season of floods, and the other one about a flood in a small city and the physician asked about actions to prevent diseases in that situation. The health assistance was about a patient that had contact with flood water and developed typical leptospirosis symptoms but was not getting better with the treatment with antibiotics. The specialist suggested considering differential diagnosis, to maintain supportive treatment and antibiotics. **Conclusion:** Telehealth is useful in situations of floods. However, as the local infrastructure is affected by the natural disaster, developing strategies such as teleconsultation using telephone or 3G internet connection may be alternatives to increase the use of telehealth in those situations.

Keywords: telehealth, natural disasters, floods

Telemedicine and Burn Injuries: A Review of the Literature and a Prestudy of Unaided Burn-Triage

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Objective: To evaluate burns, telemedicine is predicted to have an increasingly role in the future. Correct estimation of the severity of burns is important to avoid patient over- and under-referrals. In this study we aimed to assess how often guidelines for referral are met at the national burn centre (NBC), Denmark, where telemedicine is not routinely used. Further, the potential usefulness of telemedicine in estimation of burns was evaluated through a literature review.

Results: In a 3-months period 97 burn injured patients were transferred for treatment at the NBC and 30% (n=29, 95% CI: 22-40%) of referrals were considered unnecessary according to the guidelines. Some studies indicate, that electronic photo-transmission of the burns, evaluated by a burn surgeon, is as accurate as face-to-face assessment and significantly better than the estimation made by the referring physicians. Therefore, telemedicine may be useful as a safe and effective adjunct in the decision to transfer burn injured patients. Further studies are warranted to establish the extent of the potential uses of telemedicine in burn injuries.

Conclusion: In our study, the number of unnecessary referrals was 30%. How much over-triage is acceptable in the field of burns will be up to the burn specialist to decide. However it is also important to be aware of the potential under-triage and the consequences for the patients' morbidity and mortality. Implementing digital images transfer before admission might reduce both over-and undertriage and have a beneficial effect on the economy. Therefore, the authors propose digital transmission of photos as a supplemental diagnostic tool in decision making.

Keywords: Burns, images transferral, overtriage

Telemedicine and eHealth in Poland: A Review (Polish Telemedicine Society Perspective)

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The telemedicine and eHealth implementations have been reported across medical specialties in Poland, but a comprehensive review of these reports is lacking. The aim of this study was to conduct a systematic review of the published literature on telemedicine and eHealth. Data sources: Databases Pubmed MEDLINE and EMBASE were searched with keywords, "telemedicine" and "eHealth" and "Poland". The search yielded 118 potentially eligible hits in Pubmed MEDLINE and 93 in EMBASE, which were independently reviewed by two investigators. Ultimately 99 articles met eligibility criteria and were included in the review. Studies were included if the abstract or core text expressed use of telemedicine or ehealth in Poland. Articles were hierarchized within a specialty category. The telemedicine and eHealth were implemented and reported mainly in cardiology, pathology and family medicine. Oncology, psychiatry, radiology, laryngology, orthopaedics and elearning are less frequently reported as implemented in Poland. The society members were infrequently involved in reviewed papers. Despite more frequent deployments of telemedicine and e Health in Poland works published in international journals are relatively rare on this topic. Further analysis of the current state of development in this area is needed.

Keywords: telemedicine, eHealth, Poland

Telemedicine and E-Health in Republic of Kosovo and Its Impact in Health System and Medical Education

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Advanced technologies such as computers, diagnostic imaging, robotics, voice-activated machines and remote control capability have changed hospitals and operating theatres in hospitals around the western world.

Telecommunication has become the main source of fluid exchange of information across the boundaries of our since the introduction of satellite transmission and application of land-based topologies. This system has become the hope to the developing countries and their most remote areas as they strive to become part of global medical community.

One of the few examples of successful integration of telemedicine and e-health system in extreme conditions, the case of the post-war conflict, is Kosovo with its Telemedicine Center located inside the University Clinical Center of Kosovo-UCCCK, which, after a hard work, was inaugurated on December 10th 2002.

Now it has become the encouragement of the other states of the region for integrating and applying the telemedicine and e-health system in their health infrastructure.

Telemedicine Center of Kosovo-TMCK is active in videoconferencing, broadcasting, live surgeries (for educational purpose for all staff of UCCCK, in main purpose the continued education of young doctors and medical students) and conducting lectures and seminars between the TMCK in Pristina to other sites within Kosovo and externally.

The functioning of telemedicine and e-health system is based on the main purposes: establishing and providing distance learning; advanced e-health professional's education in changing environment; continuous medical education for medical students and young doctors; patient's education in health related issues in the information age.

The main purpose of this retrospective paper is to evaluate Telemedicine development in Kosovo and its impact in health system and medical education

Methods and Materials :For successful application of a program and an entire system as it is telemedicine, there urges the need of careful planning, a highly sophisticated telemedicine network, professionals, technical support 24 hours per day and the organized system of collecting data which was done in TMCK.

Data used for this retrospective paper include published papers of Professor R. Latifi, the founder of TMCK, the PubMed publications and papers and data from the protocols and staff of TMCK.

The data included the videoconferencing, seminars, live surgeries, broadcasting, conducting lectures in the main purpose of education from 2005 till 2011. In this paper were included also the participants from other telemedicine centers in other cities of Kosovo: Gjilan, Peja, Prizren, Gjakova, Mitrovica and Skenderaj.

Results: TMCK from its foundation has broadcasted > 50 lectures and seminars endorsed by Ministry of Health and Continuous Medical Education, 5 international telemedicine and e-health congresses, the last one held on 9-11 December of 2012 and thousands of entries that used the e-health system for education especially young doctors and students.

Conclusion: Assuming, based in all this, that telecommunication will be having a great influence in our lives as medical professionals as well as patient's educating information age by braking boundaries and easing the treatment of many diseases as well as perishing them.

Keywords: telemedicine, Kosovo, eHealth, medical education, health system

Telemedicine Network for Diagnosis and Care of Congenital Heart Malformations

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Diagnosis and care of congenital heart malformations is usually referred to specialized centers. Given the wide-bandwidth networks, interconnecting today main health institutions, it is conceivable to set up low-cost telemedicine services, from reference hub centers to secondary health centers, providing collaborative diagnosis, care and follow-up of congenital heart malformations (in the fetus, in the newborn or child up to GUCH patient). A new telemedicine network is currently developed in Tuscany, using the regional WAN interconnecting the FTGM Heart Hospital in Massa and the AOU Meyer Children Hospital in Florence with the neonatology and prenatal centers. The aim is to provide regular services for collaborative diagnosis and care planning of congenital heart malformations. Using videoconferencing instrumentation, equipped for video signal acquisition from echocardiograph, real-time tele-echocardiography is implemented, as experienced by FTGM in the cooperation with Balkan countries (reported at Med-Tel 2012). Real-time tele-echocardiography during videoconferencing allows the specialist from the hub center to interact with the echo-operator, next to patient at the remote center, guiding correct examination to assure comprehensive diagnostic evaluation. Telemedicine services for elective cases will be regularly scheduled weekly, involving cardiac specialist teams, assisted by nurses and computer technicians, while 24h emergency service will be assured for urgent cases. Quality of care is improved by inter-institutional collaboration and continuity of care across the region is achieved with benefits for patients. Clinicians at secondary center, through collaborative examination and on-line case discussion, will learn faster improving their skillness. Mobility of patients (pregnant women or neonates/infants) will be limited to cases of complexity or urgency. Overall costs for health-care will be reduced saving examinations, hospitalizations and unnecessary transfers.

Keywords: telemedicine, tele-echocardiography, tele-diagnosis, pediatric cardiology

Telemedicine Service Measurably Reduces the Costs of Healthcare

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This paper compares the costs of a traditional clinical pathway of an arrhythmia patient with a modified pathway where an online consultation service is in use at a primary care facility. In addition, differences in the time it takes to complete the pathway as well as the distance travelled by the patients were studied and compared. Traditionally an arrhythmia patient's first point of contact with the health care system is a primary care facility. If the patient's general practitioner sees a need for a 24-h ECG monitoring he/she is typically sent to a secondary care facility for evaluation, monitoring and specialist diagnosis. A service where primary care facilities continuously use one or more monitoring devices and utilize an internet portal to upload the monitoring data and patient information for specialist analysis has been operational in Finland since 2005. The service allows for the patients to be screened cost-effectively in the primary care sector and as a result unnecessary referrals to the secondary care sector are avoided. The costs of referring patients to secondary care were studied and compared against the costs of screening patients in the primary care sector using the online consultation service. The results of the study clearly show that the service has dramatically reduced the cost of the clinical pathway.

Keywords: Telemedicine, eHealth, distance consultation, cost-effectiveness

Telemedicine Support on Maternal and Newborn Health in Mongolia - Analysis of Content in Communication

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Telemedicine service, as a model of providing medical advice at distance, has been proven to be a cost effective, equity and efficient health care. These advantages are attracting policy makers, hospital managers and health care providers worldwide and particularly, countries like Mongolia, where there are geographical and socio-economical barriers create disparities for adequate access to health services. "Telemedicine support for maternal and newborn health" project started from 2007 and Campus Medicus network is used as a platform for providing telemedicine services. This study designed to provide a content analysis of communication among remote physicians and experts for a period of 4 years from the project. Communications of two groups of stakeholders (experts and remote physicians) were analyzed using appropriate coding scheme for each necessary category. Conceptual and relational content analysis was used and descriptive statistical analysis was provided using SPSS 16 software. Totally 1170 cases were analyzed. Common request for second opinion were decision support for complicated clinical cases 1076(92%), distance learning 70(6%), and sharing clinical experience 24(2%). Prevalence of obstetric complications was maternal disease, complicating pregnancy and delivery 630 631(54%). Experts' response rate to physicians' request was 94%. The percentage of the locally managed cases out of the total consulted cases accounted for 86% and the percentage of referred cases to upper level care in Ulaanbaatar city accounted 14%. Remote physicians are utilizing TM service not only for obtaining experts' advice, but also for sharing clinical experience and continue medical education. Obstetric problems, particularly maternal diseases, complicating pregnancy and childbirth were leading cases for remote physicians for utilizing telemedicine services to have second opinion.

Keywords: Telemedicine, content analysis, maternal health, newborn and Mongolia

Telenursing: Advancing Care Delivery, Education and Research

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Nurses worldwide are using telehealth strategies and technologies to support and advance health care. Care delivery is enhanced through the ability to reach people with care needs that range from health promotion to disease management. Telenursing education offerings and programmes are supporting learning needs of providers, patients and healthy populations. Nursing research is adding to our knowledge of what telehealth strategies are optimal for various age groups and various disease categories. Nurses are making significant contributions to the rapid advancement of telehealth for improved health care and client outcomes. The ISfTeH Telenursing Working Group and the ICN Telenursing Network members exemplify leadership in telehealth nursing in many countries of the world.

Key words: telehealth, telenursing, education, research, care delivery

Telenursing as a Health Promotion Strategy

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Introduction: This research was developed as part of an ongoing project about the use of telenursing in care delivery to neurogenic bladder patients, aimed at verifying the characteristics of interventions based on strong clinical evidence. **Objective:** To identify, in the literature, research presenting interventions with the strongest clinical evidence on telenursing use. **Method:** Integrative review in the following databases: Medical Literature Analysis and Retrieval System on line (MEDLINE), Literatura Latino- Americana e do Caribe em Ciências da Saúde (LILACS) and Web of Science, using the descriptors telenursing, nursing care and communication means. Articles were included from the last 10 years, fully available in Portuguese, English or Spanish, and which answered the research question. This corresponded to 16 out of 144 studies. Applying the evidence quality criterion (STETLER et al, 1998), studies classified under levels 2 and 3 were selected and, for analysis purposes, Ursi's reference framework was adopted (2006). **Results:** Among the studies, 43.75% came from the USA, 18.75% from the United Kingdom, 12.5 % from Sweden and 6.25% each from Chile, Norway, Japan and China. One of the studies was a strategy used in teaching and the remainder in care, including five randomized controlled clinical trials. Eight studies were focused on care management support, six compared different interventions and two addressed monitoring characteristics. Among the subjects, 25% were type II Diabetes patients, 12.5% had cancer, and other participants were divided among general population, hypertensive patients, post-IAM, under treatment for Parkinson, psychiatric patients, elderly, women in a remote community, wounded people, nurses and nursing students, corresponding to 6.25% each. **Conclusions:** Telenursing is growing, as illustrated by its presence in different countries and the existence of strong evidence and benefits of its use. Today, it is used as a complement to improve health system integration and nursing care quality.

Keywords: Telenursing, health promotion, strategy

Teleophthalmology in Action: Ptosis Screening in Albania

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Background: Surgical correction using fascia lata auto-transplant is a treatment of choice for many cases of eye ptosis. Oculoplastic surgeons from the University Hospital of Galway (Ireland) undertook to share with their counterparts from the University Hospital Center (UHC) "Mother Theresa" in Tirana (Albania) the contemporary, state-of-the-art techniques and instruments. In order to identify the patients who would best benefit, two sessions of teleconsultations were organized, respectively on September and October 2012, before the scheduled mission of November 2012. The teleconsultations were made possible through the Integrated Telemedicine and e-Health Program of Albania, a USAID funded program that is being implemented since 3 years from the International Virtual e-Hospital Foundation. A network of 3 national and 6 regional telemedicine centers is operational in 7 out of 12 regions of Albania, reaching over 80% of the population of Albania. **Methodology** The ophthalmologist and ophthalmic surgeons from all the national and regional centers were notified two weeks prior the teleconsultations took place. They identified untreated ptosis patients and filled a form containing demographic and anamnestic data, as well as information on general ophthalmological examinations. The first teleophthalmology consultations took place between Galway Hospital and UHC "Mother Theresa". Three patients were examined. In order to be acquainted with the examination, the technical directors of the Regional Telemedicine Centers were invited to attend the teleconsultation in person. The October session took place between the Galway Hospital and the Regional Telemedicine Centers. 8 patients were screened. **Conclusions** The preliminary screening of patients who would undergo surgical correction of eye ptosis was found very positive by both far and near-end surgeons, as well as by the families of the young patients. The far-end doctors determined the surgical approach for every case, planned the OR time and need for consumables and instruments. On site evaluation confirmed for all the 11 cases the approach that was determined through the teleconsultation.

Keywords: teleophthalmology, screening, ptosis

Telepharmacy - Pharmaceutical Care – An Assistance Project

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Introduction: The use of plants for therapeutic purposes is a part of Brazilian culture strongly influenced by the diversity of ethnic and indigenous groups. In line with new Brazilian Health System policies, medicinal plants that may interact with prescription medications can officially be used alongside conventional therapies. Brazil is a country of continental proportions with many remote regions, and as such there may be a lack of ready access to drug related information in some areas. In this context, Telemedicine and Telepharmacy services can help fill this gap in provision. It enables virtual contact to take place between health professionals, patients and pharmacists, providing an exchange of information.

Objectives: The aims of this assistance project were (1) to evaluate the interaction between medications and the culturally influenced patient habit of drinking different herbal teas in the region of Palmares do Sul, RS, Brazil, and (2) to promote a more holistic approach to the health care of patients through the use of digital information and communication technology.

Methods: Students and a pharmacist from the School of Pharmacy, PUCRS visited the main health care unit of the city (receiving site) for a period of three days to collect data through planned interviews (questionnaires). The acquired data (questionnaire responses) was inserted into an electronic patient record. The information was protected by password and sent for remote

evaluation by a pharmacist (delivery site). Results regarding the interactions of medications and herbal teas were encrypted and then sent by e-mail to the health care professionals of the receiving site.

Results: A total of 49 patients participated in this study (29% male; 71% female). Interventions were suggested by the remote pharmacist in 39% of cases, due to possible interactions and/or the presence of adverse effects.

Conclusion: The number of pharmaceutical interventions used emphasized the importance of telepharmacy as a tool to increase patient care. It can also improve the quality of life of patients by guiding them in the use of a better combination of medication and commonly consumed herbal teas.

Keywords: Telepharmacy, eHealth, Herbs, Remote, Assistance.

Telepulseoximetry Assessment for Elderly Patients during Physical Therapy – Preliminary Study

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Physiotherapists rarely use vital signs sensors to monitor patients' to ensure better patient's safety. Higher level of safety can be achieved by remote control of vital signs. However, physiotherapy and physical exercises for health are prescribed for treating disabilities and improve aerobic endurance and fitness of the patient. Remote monitoring of cardiovascular status before and after physiotherapy enables both safety and endurance assessment. This study was designed to evaluate the usefulness and applicability of pulseoximetry for physical therapy patients suffering musculoskeletal disorders. The aim of the study is to implement telepulseoximetry to assess the aerobic endurance and fitness of elderly patients during physical therapy. Remote High Signal Resolution Pulse Wave (HSR-PW) analysis, an innovative diagnostic tool for home care telemonitoring, is used to enhance patient's assessment. HSR-PW method allows for detailed evaluation of the cardiovascular system status. The pulse wave is recorded using a standard wireless electronic pulsoximeter. The group of patients suffering musculo-skeletal disorders, mainly osteoarthritis, was enrolled to this study. Wireless pulseoximeter measurements were transmitted over the Internet to server for further analysis. The examination protocols include saturation and heart rate measurements before and after a session of exercises. Patients will also fill out a questionnaire on quality of life and physical activity. The pulse waves were recorded in the range of 35%-99% with a resolution 1 % for SPO₂. We conclude that elaborated approach improves the awareness of the cardiovascular status and allows assessing patient's endurance and exercises influence on general patient's health. Acknowledgement: This study is supported by student's mini-grant 1WE/NM1/12 funded by Medical University of Warsaw.

Keywords: remote pulseoximetry, fitness, physical exercises,

Telerehabilitation for Patients Suffering Musculo-Skeletal Disorders – Own Experience Based on Implementation Projects

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“Telerehabilitation or e-rehabilitation is the delivery of rehabilitation services over telecommunication networks and the internet.” At our institution first attempts to support patients after discharge from the hospital were performed in 2004 along with founding Center of Excellence "TeleOrto" for Telediagnosics and treatment of Injuries and disorders of the Locomotor System. The pilot study utilized 3G videoconferencing and MMS services on mobile phones. In 2005 videoconference application was used for eLearning and the next year first patients were instructed and supervised by physiotherapist and orthopaedic surgeon in postoperative management and exercises. The advanced development of Habilis platform was assimilated for orthopaedic cases along with European project - Project „CLEAR” - Clinical Leading Environment for the Assessment and validation of Rehabilitation Protocols for home care is supported by European Commission project - ICT PSP CIP. The aim of this project was to assess possibilities and efficacy of telerehabilitation in home environment for patients suffering chronic diseases i.e. osteoarthritis (OA), pain syndromes, etc. Orthopaedic patients suffering OA who were diagnosed and treated in Medical University of Warsaw with use of telemedical platform either before or after Total Joint Replacement (Hip or Knee). CLEAR Consortium consisted of 13 beneficiaries representing 4 EU Member States (Italy, the Netherlands, Spain, and Poland). This project allowed to design, develop and implement clinical based protocols a telerehabilitation service for home rehabilitation and tele-care for self-management and to establish the first European standard for home telerehabilitation, freely accessible from the Website. The further implementation of the telerehabilitation utilizes biofeedback sensors along with web based videoconferencing to provide efficiently innovative telerehabilitation service in the clinical practice. Acknowledgement: This study is supported by project funded by National Center for Research and Development NR13-0109-10/2011. This study was supported by ICT PSP CIP Project „CLEAR” (www.habiliseurope.eu).

Keywords: Telerehabilitation, musculo-skeletal disorders, implementation

Telescreening of Critical Eye Diseases in Rural Areas in Lithuania

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A comparative study on effectiveness of screening for eye diseases was conducted in rural and urban areas of Lithuania with the aim to determine how the collaboration of tertiary and primary level physicians through screenings, remote diagnostics and use of suitable diagnostic equipment could enable earlier diagnostics of eye diseases in rural areas. Lower access to advanced services can have negative impact on early detection and timely treatment of diseases which also has public health, social and economic aspects as many of those diagnosed with critical eye diseases are of working age. Primary care physicians at rural locations were tasked to screen the population, detect eye diseases and assess the degree of advancement of the disease when the disease is diagnosed for the first time, and transfer data for evaluation of the tertiary level physicians. The study was conducted in several groups of patients in urban and rural areas. The following eye diseases were screened and diagnosed: glaucoma, aging macular degeneration and diabetic retinopathy. It has been observed that many patients in rural areas diagnosed glaucoma, aging macular degeneration or diabetic retinopathy for the first time had the disease in a more advanced stage as compared to the urban areas. This confirms the assumption that these critical eye diseases are diagnosed at an earlier stage in urban areas as compared to rural areas. In rural areas, lower access to advanced healthcare, lack of specialist physicians, remoteness to advanced care centers can explain the higher number of neglected cases. This study also confirmed that the methodology for the tertiary and primary level physician cooperation and use population screenings, remote diagnostics and appropriate diagnostic medical equipment in detecting critical

eye diseases can bring the service closer to the patient and effectively enable earlier diagnosis of eye diseases in rural areas. Diagnosing diseases at an earlier stage is important in improving the prospects for treatment effectiveness and mortality, and long-term social and economic costs.

Keywords: glaucoma, macula, retinopathy, ophthalmology, telescreening

TelMedHome System - Fast and Cheap Monitoring of the Patients with Cardiovascular Diseases

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The paper presents a new diagnostic method, High Signal Resolution Pulse Wave (HSR-PW) which is based on increasing the resolution of the pulse wave signal recorded during a standard test. The linear transformation method is used to increase resolution of the pulse wave. This procedure allows to obtain more detailed structure and analysis of received signal. In contrast to the results of a standard measurement, HSR-PW allows observe even minor changes in the circulatory system. The study involved twelve thousands patients in the age of 55 – 80 years. A standard CMS-50E digital pulse oximeter localized on the left hand index finger was used. The standard pulse wave has been recorded, transferred by the Internet to the analytical server and the HSR-PW analysis has been performed. It was found about 20% records with disruptions caused by the patients mobility or technical errors. 41% of recorded pulse waves were correct and all parameters were located in standard range and 39% of obtained results were pathological. The system was able to detect arrhythmia, increased vascular resistance and disadvantages of cardiac valve. It was concluded that High Signal Resolution Pulse Wave (HSR-PW) and TelMedHome is a very good system to the early detection of a minor amendment in the circulatory system. The increased sensitivity of HSR-PW enables to observe a discrete pulse wave signal changes and therefore may increase their clinical utility.

Keywords: pulse wave, cardiovascular diseases

The Bioresonance Approaches for Telediagnosis and Telecare

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The latest researches, carried in many laboratories and centers has shown, that cellules, tissues and organs are such structures, that have strict bioelectrical characteristics. It was experimentally proved, that this characteristics can fast and deeply change during the reign of pathologic processes. But beginning, latent deep changes of human organism, changes of cellules can deciphered only with the newest diagnostic method - energy-informational diagnostic - bioresonance. This is one of the latest medical diagnostic developments that allows to show the slightest changes of the human's organism. Each pathological process, causative agent, each deviation of homeostasis has its individual strict energetic spectrum. Such technology gives possibility to get full information about the health of a patient, in view of age-dependent, interlabial and other factors, and localize any early presentations of diseases, what is impossible when is used any of other present-day diagnostic methods, which can detect only already formed pathologic process. The paper aims to present some novel approaches to integrate bioresonance with telemedicine practice and to present first results of combination of telediagnosis solutions based on bioresonance diagnostic tools. Additionally will be presented some preliminary work on telecare based on bioresonance therapy.

Keywords: bioresonance, telediagnosis, telecare

The Challenges and Opportunities for Mainstreaming Telehealth - A UK insight

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The UK has completed the world's largest Randomised Control Trial with 6,000 patients on the use of telecare and telehealth to enable users to manage and take greater responsibility for their own health, as well as providing greater independence within their own home and community. While the results of this trial have received a mixed reaction from clinicians and other stakeholders what has been clear is that technology enabled services:

- do not lead to social exclusion, as had been feared, but instead enable a similar quality of life, possibly slightly better;
- lead to reduced mortality, and reduced unplanned admissions (i.e. improved quality of care).

As a result the UK has launched a campaign to support 3 million new users with telecare and / or telehealth over the next five years. This will be about delivering telecare and telehealth as mainstreamed activities, embedded in the provision of health and social care. It presents the greatest opportunity, but also the biggest set of challenges, in achieving this goal.

Key words: telecare, telehealth, 3 million lives,

The Digital Divide: Still a Reality?

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eHealth is a promising means of overcoming some of the healthcare and delivery problems facing the developing World. The digital divide describes the gap between people with effective access to, and the ability to use digital and information communication technologies (ICT), and those without. With the growing use of mobile phones and computers in the developing World there is a perception that the digital divide is no longer an issue that might impede eHealth. But what is the reality? This study examines the current status of the digital divide in the developing World in general and Africa in particular. Methods: Data on mobile phone penetration, fixed phone line access, proportion of households with Internet access, Internet use, fixed and mobile broadband access, ICT costs, population age distribution, and poverty indices were obtained from publications of international agencies such as the WHO and ITU. Results: Over the last ten years, the gap between the developed and developing World for fixed phone line penetration, the proportion of households with Internet access, internet penetration, fixed broadband penetration and mobile broadband penetration continues to increase. With 42% of Africans living on less than US\$ 1/day, purchasing power parity, and the very high relative costs of basic ICT services it is unlikely that the situation will improve in the near future. Conclusion: Poverty is driving the digital divide. While mobile telephony will improve current levels of communication, the high relative costs of mobile phone use, bandwidth, connectivity and power, will maintain and even continue to widen the digital divide in Africa and the developing World, and may lead to a growing health gap as eHealth and mHealth solutions remain out of reach of the poor who are most in need of better access to and quality of healthcare. Technology is constantly evolving and new technology is usually expensive. Care must be taken to plan and implement eHealth solutions that can be used successfully on low cost, simple mobile phones and at low or no cost to the patient if the potential benefits of eHealth are to be realized in Africa.

Keywords: digital divide, developing World

The e-Learning Platform Developed by Clinique Bohler

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Health education and coaching represents 75% of the support given to birthing mothers during their stay. Their important need for information, advice and support before and after treatment convinced Clinique Bohler to invest in the development of an e-Learning platform in order to

1. Establish early contact with the patient base.
2. Develop communication channels and innovative training.
3. Be accessible to current customers whatever their geographic distance to the Clinic.
4. Provide consistent information and quality education before, throughout and after the patient's journey and stay.
5. Anticipate patient questions, needs and concerns.

The e-Learning platform developed by Clinique Bohler is:

- A unique platform for preventive health and health education of women and support for future parents through new multimedia technologies,
- providing a variety of learning tools (educational videos, quizz,) in gynaecology and obstetrics,
- and live interactive sessions via internet supported by nursing staff at the institution offering the opportunity to patients to participate from home or during hospitalisation to the online workshops.

To cover the multilingual and multicultural context of Luxembourg, we have the following expectations:

- High quality standard with all contents developed and controlled by medical professionals, the multimedia tools developed and the pedagogical tools developed by specialized professionals.
- Multi-language learning platform and interactive live sessions given by native speaking professionals.
- Large coverage of all important issues in obstetrics and gynaecology adapted to a large number of cultural backgrounds.

Keywords: health education, eLearning

The EMPOWER Project - Facilitating Self-Management of Diabetes Patients by Intelligent, Knowledge-Based Pathways

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OVERVIEW Within the EMPOWER project a modular and standard-based patient empowerment framework is being developed which will facilitate the self-management for diabetes type 1 and 2 patients. Research focuses on the development of knowledge-based self-management pathways for diabetes patients. These are realized through the combined use of the following services: Personal health record based monitoring of vital, physical and mental parameters as well as physical and lifestyle activities; Automatic generation of patient-specific treatment recommendations and manual selection and addition by health professionals; Guided definition of

goals and corresponding actions by patients to accomplish given recommendations; Support of the patients' self-dependent execution of actions to facilitate changes of behaviour according to individual health care needs; Seamless, consistent and standard-based integration of relevant data originating from existing systems like EMRs of participating health care institutions, regional or national EHRs and PHRs. The EMPOWER core services will be implemented in two pilot deployments in Germany and Turkey to ensure the generalizability and applicability of the project's overall outcome. METHODS After a comprehensive literature review has been conducted, common requirements engineering activities have been carried out to come up with a detailed specification and design concept. Details and issues have been clarified within the scope of regular experts' discussions involving consortium's partners and domain specialists like doctors and nutritionists. RESULTS Whilst a first prototype is being implemented right now and envisaged to be completed before the Med-e-Tel conference, presented results will highlight pilot specific differences and discuss resulting challenges that are addressed by the underlying concept. Detailed insights and early prototyping experiences will be provided with focus on technical and semantic integration, design aspects of the service-oriented architecture and approaches to adequately address country-specific differences.

Keywords: empowerment, diabetes, integration, knowledge-based, guidelines

The Essence of Teamwork: Industry, Academia, and Government Collaboration for the Future of Telemedicine

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The field of telemedicine is inherently a multi-disciplinary field, and to date the most successful projects involve collaborators from diverse sectors. We report on our experience using telemedicine in one of the biggest sporting events in the world: the 2012 London Olympics. In this innovative project, The University of Miami William Lehman Injury Research Center, the Brazilian Olympic Committee, Ice.dot, and several technology industries (Qualcomm, InTouch Health, GlobalMed) implemented a full telehealth solution for the medical care of athletes during the games. A hub-and-spoke telemedicine network was established virtually connecting sites in London, Rio de Janeiro and Miami. The network consisted of using a combination of remote presence robots and wireless technology. Team doctors were equipped with next generation mobile devices powered with video conferencing capabilities. In case of injury to an athlete, team doctors could quickly access a remote specialist for support or a second opinion. Athletes were given arm bands containing their basic medical information which could be activated via SMS. A command center established at the sports training center in London functioned as a call triage and project coordination center. Consultations were available for specialties such as trauma, orthopedics, cardiology, intensive care, gynecology, neurology and ophthalmology. This presentation will describe the successes and challenges of implementing telemedicine project during the games. Participants will identify the importance of collaboration with multiple stakeholders and best practices with deploying a widely dispersed international telemedicine network. Lessons learned from this project will help guide future efforts that can be applied to not only sports medicine, but all of healthcare.

Keywords: mobile technology, networks, international collaboration

The Experience of Research and Development of Second Opinion in Health –UERJ Nucleus of Brazilian Telehealth Networks

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Introduction and Aims: Experiences in the use of teleconsulting represent a strategic change in health practices. The possibility of professionals working with the perspective of support at distance for a second opinion may contribute, effectively, for the improvement of the attendance to population. With such a vision, a software dedicated to teleconsulting, named Siates (System of Support to Teleconsulting in Health), was created. This work intends to present the results of the use of Siates by health professionals. **Material and Methods:** web-based system, developed in open software, with PHP language and use of PostgreSQL data base, a specific software for teleconsulting consisting in sending clinical or general doubts on health by submitting an online form. The access is made through a distance education platform (Moodle), in which recorded seminars, online courses and other materials are available. **Results:** Until now, 30,024 health professionals are registered at the platform, 39.84% of whom use SIATES. Concerning the teleconsultings requested, 52% were related to clinical doubts, 16% to education in health, 12% to community approach, 9% to process of work, 6% to familiar approach. Among the users of the system, 36.09% are nurses, 21.56% are physiotherapists, 8.75% are nutritionists, 7.7%, physicians and 2.44%, dentists, including also other careers. The group of physicians and nurses prevails in sending clinical case consultation doubts. **Conclusion:** Teleconsulting is breaking paradigms in clinical practice and in health education.

Keywords: teleconsultation, telehealth

The Experience of the Implementation of a Telehealth Resource Management Course in Brazil

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Introduction - Brazil is a rich field for use of ICT applied to health related activities. Currently, the country is moving towards the institutionalization of telehealth actions through incorporation of telehealth resources on its National Health System. In recent years, 63 technical-scientific clusters were implemented throughout all Brazilian states, covering 16,836 Family Health Teams and 3,256 municipalities. For the success of actions implemented, it is essential the training of coordinator staff in each cluster. **Objetives** – To develop a Telehealth Resource Management Course for the training of telehealth team coordinators. This course is part of the process of strengthening primary care and telehealth in the country and aims to train leaders of the scientific-technical clusters and managers of the Brazilian NHS, at the state and local levels, in the process of incorporation of telehealth resources for both healthcare and education. **Methods** - The course was developed in a partnership between the Department of Primary Care of the Health Ministry of Brazil and the Health Technology Center of the Medical School of the UFMG. It was applied online in the second half of 2012 and is near completion and evaluation of the results achieved. Its structure is modular, with a total of 76 hours, applied over a three months period. The content was formulated by teachers of different Brazilian universities expressing the great accumulation of knowledge and experience existing in the country in relation to telehealth. Animation, 3D modeling, and video were used in the production of the classes. The tutoring system allowed wide monitoring and assistance to students. Module I provided an overview of telehealth; in Module II the focus was on project management; and in Module III experiences of telehealth in Brazil were presented and discussed. Three hundred and three students, of all Brazilian states, signed up for

the course. Results - The results concerning the effectiveness and quality of this course will be obtained through the verification of grades achieved by students and analysis of data in the course evaluation questionnaire

Keywords: telehealth, management, education, primary care

The Impact of Using the Social Web for Health Educational Actions: UERJ Nucleus of Brazilian Telehealth Networks

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Introduction and aim: The Social web is a new environment of communication, information and learning, which embraces many tools, in order to support and promote social interaction. Those online means of interaction – including Facebook, Twitter and other sites – are the basis for the main part of the health educational activities that happens in UERJ Telehealth Center. This work intends to presenting the impact of the social web as a support for the disclosure and maintenance of Telehealth, in a country with so large dimensions such Brazil. Methodology: Twitter and Facebook profiles with specific contents, and a general gateway were created for the research. From November 2011 to November 2012 a quantitative and qualitative analysis was made with the use of specific tools. For evaluating Twitter, the TweetDeck was used – it enables measuring the level of satisfaction with the publications and also the level of interaction, and still makes possible to observe what the users are telling concerning the posts. In Facebook and in the gateway, Google Analytics was the tool used for measuring the analysis and number of visits. Results: In Twitter, the most significant posts which showed more interaction and reactions of the users were the ones related to online distance courses provided monthly and the weekly virtual seminars. The UERJ fan page has got a total weekly number of 892 visualizations of the contents related to the page. The viral effect, e.g., the number of people who created something using its contents was 52.98%. The number of comments detailed by gender and age of the users were 86.3% women (25-34 years old) and 13.1 men (either) in a total of 5,097 “friends”. Conclusion: Social web proved to be efficient in the quick disclosure of UERJ Telehealth initiatives and making easier the access to its contents.

Keywords: Social Web, Social Networks, Telehealth

The Medical ICT Utilization to Perinatal Telemedicine in Remote Areas

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Recently, the number of obstetricians has declined significantly. This has caused many problems to some of the regions in Japan. In Tono city of Iwate prefecture, there are no obstetricians or gynaecologists. Pregnant women who receive perinatal checkup, must go to the hospital beyond the steep hill, 50km away. A few years ago, in Tono city, a maternity center was built then there were a few midwives in the center, and the network were developed linking mobile-CTG (portable fetal heart monitor) and the perinatal electronic record. By using a combination of video conferencing systems, physicians and midwives share the same master patient data, which can be a commercialized system of telemedicine. Meanwhile, there has also been an effort to take advantage of the Maternal and child health (MCH) handbook system, with which a pregnant woman can verify the perinatal electronic data by herself. It is desirable that the Electronic medical record data entered by a physician is linked to the electronic maternal and child health

handbook. The pregnant woman can see by herself the data entered at the hospital. The need for a network linking hospitals, clinics, maternity center, and homes is expected to increase more and more. After that all of the perinatal data in the hospitals and municipalities were gathered to the data centre in Iwate prefecture. That data would be utilized for the health management of pregnant residents. There is a great need for data integration technology to develop perinatal care, and IT technology and smart phones are expected to evolve in the future.

Keywords: perinatal, telemedicine, mobile-CTG, MCHhandbook, remort

The Mongolian Model of Telemedicine and Telepathology: Concept and Practice

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The Mongolian Health Services are well structured. Yet the long distances between the aimag hospitals and the main central hospitals in Ulaanbaatar are a barrier for providing adequate medical care to people and supporting medical personnel in rural areas. Telemedicine can contribute significantly to solving this problem, e.g. by supporting rural doctors in diagnostic and therapeutic decisions including e.g. the decision to refer a patient from an aimag hospital to a central or a specialised hospital. The well-structured Mongolian health care system provides ideal conditions for successfully introducing telemedicine as a supporting element. The presentation shows the implementing of telepathology in Mongolia starting in 2008. Goal was to connect surgeons and pathologists in rural Aimag hospitals with hospitals in Ulaanbaatar the capital of Mongolia. In rural Aimag hospitals either no pathologists or no well-experienced pathologists can exchange patient cases with expert pathologists. This can be done for cases where histo and cyto pathological slides are available or during a surgery when frozen section diagnoses are necessary. Since 2008 until today it is used by a number of medical doctors. The software used is CampusMedicus, a web-based software. The telemedicine software is also used for live video conferences, as interdisciplinary tumor boards or for teaching, and numbers of screening/surveillance purposes.

Keywords: Telepathology, Screening, Surveillance, Diagnostic support

The Need for a Clearer European Vision for Telehealth

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The European Commission eHealth Action Plan for 2012 to 2020 provides a focus for telehealth and stimulates a debate on the role of telehealth services in helping meet changing health and well-being needs. This paper points to the need for a wider understanding (and definition) of telehealth and to the way that the European Code of Practice for Telehealth Services (developed within the European Commission funded TeleSCoPE project) is poised to make its mark – influencing the shape of telehealth services; providing an essential quality benchmark; safeguarding users and helping to give clarity to the European vision.

Keywords: Standards, Benchmark Quality, Telehealth Users

The Power and Economic Impact of Network Based Medical Device Aggregators

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After almost twenty –(20) years of deploying the same architecture for medical device information delivery the world is rapidly changing. New methodologies that use the best of older principles and the most promising new technologies are shaping the industry at a very rapid pace. This presentation will explore the history of telemedicine and its associative technology. The pros and cons of different architectures will be reviewed delving into the pros and cons associated with them. Methodologies for addressing the disadvantages while driving Physician adoption and lower costs will be explored and the organizations utilizing these newer methods will be profiled.

Keywords: Technology, Exposure, Deployment, Economic Benefits

The Release of a Moodle Mobile Plugin for Tablets and Mobile Devices

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Two years ago the Institute of Tropical Medicine in Antwerp, the Institute Alexander von Humboldt and the Universidad Peruana Cayetano Heredia in Lima set up an mLearning project, funded by a Reach Tibotec grant, in order to enable physicians involved in HIV/AIDS care in remote areas in Peru to access the state-of-the-art in HIV treatment and care through a mobile-based educational platform.

A set of learning scenarios simulating interactive clinical cases were developed, adapted to mobile devices (iPhone and Nokia N95 phones) and sent to physicians working on HIV/AIDS care in urban and peri-urban stations in Peru. The technology used to develop the didactic material sustained links to trustworthy sources of information (i.e., Pub Med, WHO library...) and could back-up for possible assistance. Learning outcomes of the acquired knowledge were assured by multiple choice questions at end of each module. A functional platform, web based, with a mobile interface (MLE, Moodle mobile) was offered to support the learning events. This project won a Brandon Hall Golden award and was chosen as Best Academic course at DemoFest in 2010.

Once the pilot phase of the project closed, the development of a better mobile interface, not limiting the use of all Moodle features, became mandatory.

The international mLearning group working on this educational project was finally able to release an open source plugin, only for mobile phones on the Moodle community (<http://iphone.moodle.com.au>). Unfortunately, the code of this project has been shown to be too difficult to be maintained. However after 2 years of work, the partners of this project managed to make available a stable code to the whole Moodle mobile community (<http://m.ideas4ict.com>), adding as well a tablet interface. We hereby present the release of a Moodle mobile plugin for tablets and mobile devices, as a result of this pilot project in Peru.

The Role of Raised Cosine Shaping Filter Parameters in ECG Transmission Quality via WLAN IEEE802.11b Channel

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The purpose of this work is the study of the shaping filter (mainly Nyquist filter). This study will be concretized by simulation in SIMULINK/MATLAB of the ECG signal transmission quality via the IEEE 802.11 b WLAN network. Our analysis consists on evaluating the performance of the Raised Cosine Filter for ECG signal transmission quality via the WLAN IEEE802.11b channel, simulated on the simulink/Matlab software. The raised cosine filter is defined with a set of parameters that are the sampling and cut-off frequencies F_s and F_c , the roll-off coefficient α ; and the 'Kaiser' truncation window order. To well achieve our task we have fixed the sampling and cut-off frequencies and varied the roll-off coefficient α ; and the 'Kaiser' truncation window order. The quantitative (numerical) evaluation as well as qualitative one, concretized by eye diagram and visual perception, demonstrate that for an adequate ECG signal transmission quality (without or with reduced inter symbol interference) a judicious choice of RCF parameters should be taken into account. Our analysis shows that for a comprise of null inter symbol interference ISI and good spectral efficiency the set of the 'Kaiser' truncation window order of 40 and roll-off coefficient α ; of 0.3 should be utilized for the definition of the Raised Cosine Filter RCF. This latter combination provides a BER of 9×10^{-4} and difference error (between the transmitted and received ECG signal) of (0.0018 \pm 0.1024).

Keywords: RCF Filter, ISI, WLAN, ECG

The Social Worker in TMC

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The National Russian Program "The Health" aims to provide the population the best available healthcare. Telemedicine eliminating distance as a barrier to healthcare turns to be of great importance in solution of this problem. Optimal organization of work of TMC plays an important role in its effective function. We present our 5-years experience of function of TMC. It is based on more than 500 TMC consultation and 400 lectures for doctors from far distant regions of Russia (Siberia, Far East). The team of TMC includes different specialists. We consider the social worker to be its important member. The main functions of social worker in TMC include: 1. Organization of consultation between a patient and health professional (doctor), providing medical data. 2. Organization of medical education for health professionals in remote locations. 3. Releasing the potential of wider implementation of telemedicine services at the regional level by means of organizing workshops and conferences, Conclusion: due to the Telemedicine, high-quality medical assistance becomes available for patients from the most remote areas of Russia, a country that stretches for thousand kilometers. Telemedicine provides the best available postgraduate education for physicians from far distant regions.

Keywords: Telemedicine, TMC, medical social

The Teledentistry Center at the Faculty of Dentistry, University of São Paulo: Better Education for Better Health

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The Teledentistry Center at the Faculty of Dentistry (NTO-FOUSP), University of São Paulo was created in articulation with the Center of Telehealth of Sao Paulo, as part of the Brazilian Telehealth Program, by the Ministry of Health (www.teleodonto.fo.usp.br) Its first aim was to offer support to the professors for a better use of ICT in the teaching and learning process. It

should also offer teleconsultancies and the Second Formative Opinion for dentists and other health professionals working at the Unified Health System (SUS). It started with the development of research, and two post-doctoral degree works dealing with real time transmission events and a project of creation of a Center for Digital Production. The subject of Teledentistry was established at the levels of undergraduate and post graduate courses. The faculty hired a Teledentistry Professor, first one in the country, specially for Teledentistry. Teledentistry started to be used by many Departments at the Faculty of Dentistry with the support of the NTO-FOUSP. Learning objects and e-learning courses have been developed, as for example in atraumatic restorative treatment, dental surgery, prosthesis, endodontics and bioethics. Researches and published articles have registered their positive results for the teaching and learning process. A maternal and infant e-learning course with a multiprofessional approach was developed in partnership with the Discipline of Telemedicine of the Faculty of Medicine at University of São Paulo and the Federal University of Maranhão. In partnership with the Brazilian Association for Dental Education, the NTO-FOUSP has worked on the creation of the Brazilian Teledentistry Network, involving education and research institutions, as well as health services, helping health professionals in delivering a more resolute health care. We have been working with the moodle for the management of e-learning courses and collaborative work. It has already benefited 1026 students and 319 professors at FOUSP.

Keywords: telehealth, teledentistry, e-learning, telecare, education

The UK NIHR Health Technology Co-operative (HTC) in Mental Health and Neurodevelopmental Disorders

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The UK's National Institute for Health Research (NIHR) has recently announced the establishment of eight Healthcare Technology Co-operatives (HTCs) to devise technology-based solutions that will improve patients' quality of life and the effectiveness of the healthcare services that support them. The HTCs target areas of high unmet need where relatively little technological innovation has occurred and are designed to facilitate collaboration between industry, academics, clinicians and patient groups. The Mental Health and Neurodevelopmental disorders HTC is a joint venture between the Nottinghamshire Healthcare NHS Trust and the University of Nottingham's Institute of Mental Health involving mental health clinicians and clinical scientists, computer scientists, engineers, health service researchers, service users and carers and experts in Health Technology Assessment. The development of new technology is needed particularly in this area since currently much of the diagnosis and assessment within the mental health field is subjective; as recognised by the recent establishment of the NIMH's Research Domain Criteria project in the USA. The application of e-health technologies and telemedicine has the potential to transform mental healthcare by increasing patient's involvement in their care, monitoring and outcomes and enhancing interactions with both real and virtual clinicians. In addition to providing an overview of the Nottingham based HTC, specific current projects that will be described include: the assessment of commercially available e-health tools that provide a means of assessing mental health disorders and of delivering support and care; and the objective automated monitoring of facial behaviour and movement that alters in patients with various neuropsychiatric conditions. However, in addition to the work on these projects a key role of the HTC is to facilitate the translation of new ideas and technologies into clinical practice. We are therefore actively seeking to form new collaborative partnerships with those involved in the design,

deployment and assessment of tools that can be used to aid diagnosis, on-going monitoring and patient support.

Keywords: Mental health, Neurodevelopmental disorders, HTA

The Virtual International Pathology Institute (VIPI): Idea – Implementation – Work

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Background: Application of medical electronic communication enters the door into digitized tissue – based diagnosis. As result, the foundation of the first Virtual International Pathology Institute (<http://www.diagnomx.eu/vipi>) was released under the proposed auspices of the European Society of Pathology (ESP) in December 2011. Foundation and Aims: VIPI consists of more than 60 experienced pathologists who are working in different institutes / departments of pathology located in different countries. They agreed to serve for all diagnostic demands in surgical pathology, such as expert consultation, education and training of young colleagues, quality assurance of pathology institutes, formal and human quality judgement of digitized glass slides, advisory service for industry, and research in digitized pathology. Regulations and Bylaws: Agreed bylaws regulate formal aspects of VIPI in a fully democratic manner. Medical and technical issues are handled differently. The medical director and advisory board are elected for a limited period (3 years). They are responsible for diagnosis assurance, fast response, education, and recent medical research. The technical director steers the technology and regulates financial issues. Technology and Implementation: The backbone of VIPI is a php based forum connected to external specific servers, and designed for medical consultation, optional liable diagnosis, image quality control, and automated image (immune histochemistry (IHC), fluorescent, HE, and other) measurements (EAMUSTM). Image quality improvement related to out-of-focus, white unbalance, shading or insufficient magnification is included. Automated language translation from English into frequently used languages (Chinese, French, German, Italian, Japanese, Portuguese, Spanish, Thai, etc.) is provided. All experts are members of VIPI. A calendar regulates the “experts on duty” in weekly periods. Work: Successful tests of the system including formal and medical issues have been undertaken for one month. The routine work of VIPI will start on January 1, 2013. Its results will be presented at Med-e-Tel, Luxembourg in April 2013.

Keywords: Virtual International Pathology Institute (VIPI), Image measurements, Expert consultation, Medical php forum, Digital tissue based diagnosis

The Virtual Organization in Telemedicine: Problems and Solutions

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Introduction: When personnel from different organizations work with telemedicine, they form virtual organizations. In a virtual organization, work can be done across space and organizational boundaries, and even across time. In two Norwegian telemedicine projects, organizational problems were identified and solutions to the problems designed. The more than 40 publications show numerous organizational consequences and numerous types of organizational consequences. Today, more than 25 studies from several countries confirm and corroborate the findings.

Aims: To show the fundamental role organizational problems have for telemedicine.

Results: For the question of how to organize telemedicine services in larger areas, or for larger health enterprises, centralisation and decentralisation are important terms. Different organizational alternatives show advantages with telemedicine, for example: better exploitation of work capacity by new distribution of workload, economies of scale and potential for quality improvements. As a consequence of telemedicine, we find internal organizational changes, for example: the considerable learning connected to telemedicine makes learning organizations relevant and changes in job situation. For telemedicine collaboration between organizations, measures of collaboration should be implemented, for example: someone should be made responsible and work tasks distributed, and face-to-face meetings should be organized (knowing each other plays a positive role). For pretty different applications (for example teleconsultations and teleradiology), we find some similarity in organizational consequences.

Conclusions: Work with organization should be done for the telemedicine virtual organization. The organizational problems connected to telemedicine are gravely underestimated.

Keywords: Telemedicine, organization

The Webconference as an Educational Resource for Telehealth Brazil Networks: Decreasing Distances in MS, Brazil

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The Telehealth Brazil Network Program uses information and communication technologies that can contribute to the Primary Health Care (PHC) strengthening and its establishment as the care coordinator and the Health Care Network ordinator. In Brazil, the PHC is represented by Family Health Strategy, which, in Mato Grosso do Sul (MS), covers 63% of the state population. Accordingly, the Scientific-Technical Core for MS Telehealth is characterized as a support service to provide diagnostic and therapeutic teleassistance and tele-education to the 78 municipalities of the state. This abstract reports the experience, which has begun in 2012, from the State Core with webconference as a resource for permanent education to Family Health teams. Until December 2012, there were 42 webconferences with topics suggested by the Family Health Teams and recognized as being of fundamental interest to the PHC, with an average of 25 connections and 9 municipalities participants per event. The webconferences addressed various topics, and 69.05% of them focusing on health care, 26.19% on working process within Family Health and 4.76% with a focus on Health Management, always based on the best evidence and practices available, contextualized to the Unified Health Brazilian System (SUS) and the reality of the state. In general, they are multidisciplinary and sometimes are targeted for specific professional categories. They are defined within at least 15 days to facilitate Family Health teams participation in their workplaces, disseminated through email and social networks. The duration average is 2 hours and professionals can suggest dates and times, as well as new themes for seminars. Its use at another time is also possible, since they are made available on the site for later access, and can be accessed online or by download. Although the numbers are still small, considering that the activities are recent and it's growing participation, webconference has proved to be a powerful tool to permanent education in health services able to increase access for PHC professionals to information, promoting practice update and fostering discussion about improving access and quality of care.

Keywords: Primary Health Care, Telehealth, Webconferences

Towards Applying Cloud Computing Technologies to Support PACS in the Public Hospital Routine

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The volume of medical images produced in hospitals and medical centers have increased fast. The annual data produced from exams in the big radiology centers is greater than 10 Terabytes. Therefore, the growing medical images represent huge quantities of data that need to be stored with assurance, automatically processed and must be indexed in a intelligent and safe way, because they are fundamental pieces in the clinical diagnosis. The PACS is an approach widely used currently for storing images. However, the PACS has limitations in the current scenario, such as limited physical storage and high cost of investment in data centers. Cloud Computing (CC) is a brand new paradigm which promisses to provide hardware and software resources as a service by virtualization, giving mechanisms and expanding on demand resources at a low cost investment. One of the most popular services is cloud storage which make available storage resources. PACS can leverage the storage service for improving data availability and reliability, scalability, while reducing the large upfront investment. This paper reports the experience of shifting PACS from traditional infrastructure to cloud environment in a Public Hospital of a developing country. In this paper it was built a private cloud using the virtual structure manager OpenNebula and the hypervisor Linux KVM. In the cloud, were allocated the PACS service, using the DCM4CHE, and the computer-aid diagnosis tool InVesalius. This environment was constructed under Ubuntu Linux. The images in the medical equipment in the DICOM standard are transferred automatically to the DCM4CHE. From the InVesalius it is possible to recover and visualize the images stored on PACS. It was developed using open source tools in order to reduce costs. Although this environment is low cost, it was kept the security, reliability and the availability of medical data. Therefore, the solution presented is adequate and easily replicated to small clinics and public hospit! als in developing countries that do not have a PACS.

Keywords: Cloud Computing, PACS, Medical Images

Treatment for Mobbing Victims by Telepsychiatric Services

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Objective: Mobbing in the context of human beings means bullying of an individual by a group in any context, such as a family, school, workplace, neighbourhood, or community. Telepsychiatry, as a branch of telemedicine, may be defined as the delivery of psychiatric treatment remotely, using live two-way video-teleconferencing equipment. In this paper, we showed the experience, application and effect of various treatment models, including consultation for mobbing victims by telepsychiatric services.

Methods: Sample data included 100 examinees, in the age of 18-65 years. They have been treated in Center for telepsychiatry in virtual psychiatry Ambulance for various psychiatric syndromes, all having the same denominator-mobbing, as ethiopathogenetic factor. Sample data included control group of 62 subjects of mobbing victims who were not treated. In the research, the following instruments were used: Questionnaire of socio-demographical, Telepsychiatric interview (with teleconsultation), Beck's scale for self-esteem of depression, Hamilton's scale for depression (HAM-D) and Hamilton's scale for anxiety (HAM-A). Results: Upon evaluation, it was identified that major proportion of examinees shows: Mental health and psychiatric dignosis 62(62%) and other Diferent somatic diagnosis 35(35%) and only 3(3%) without any diagnosis.

From 62(62%) Mental health and psychiatric diagnosis 46(74,2%) is with symptoms of depression (p

Keywords: Mobbing, treatment, telepsychiatric services,

Ubiquit Maternal Care Using Information Communication Technologies with Meshing Approach

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Technology innovation in the field of healthcare, improves health tools in current era, different methods and tools developed for attaining the same goal i.e. cost effective quality health facilities, beside this there is no remarkable achievements due to different hierarchy of these health tools. Maternal care is one of the leading domains affected from the same reason; thousands of maternal deaths are reported globally, especially from developing countries in every year due to negligence of maternal care in remote areas by the healthcare providers because of less economic benefits against huge investments. In this study we are going to design an algorithm by bridging different information communication technologies including telemedicine and mhealth that track pregnancy status, once a mother has registered herself. The proposed system will have an ability to make decision whether there is a need of teleconsultation between mother and concern gynecologist and gynecologist to specialist on the bases of medical history of the same mother using mobile phone. In the given concept mobile phones are used for communication tool among the mother, gynecologist, specialist and district health management system. The development and implementation of proposed system can be achievable by using open source application development tools like front line sms, openMRS and java, which make it cost effective and beneficial from both users as well provider's point of view that may lead to distance learning for health practitioners globally.

Keywords: maternal care, mHealth, ubiquit health

Usability Testing of a Monitoring and Feedback Tool Measuring and Stimulating Physical Activity

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In the It's LiFe! project an innovative monitoring- and feedback tool was developed in a user centred development process. The tool stimulates physical activity of patients with COPD or type 2 diabetes through self-monitoring, goal setting and action planning supported with automated tailored feedback. The tool is linked to the primary care practice, which makes it possible to use objective activity results during physical activity counselling. The tool consists of 1) an activity sensor with Bluetooth connectivity worn on the hip; 2) a smartphone with an app for mobile feedback; 3) a server with websites for comprehensive feedback and data entry for patients and practice nurses.

A usability study was performed to improve the interfaces of the app and the patients' website. Usability testing intents to reduce errors and need for user support. It improves acceptance, and therefore leads to a better compliance to the intervention. The end users of the tool are patients with COPD or type 2 diabetes (age 40-70 years). The usability was tested in four successive stages 1) a heuristic evaluation by 6 technology specialists 2) a usability test in a lab situation by 5 patients 3) a pilot in real life in which 20 patients used the tool for 3 months and 4) a final lab test by 5 patients. In both lab tests qualitative data was collected through a thinking aloud procedure

video recorded with usability testing software and quantitative data with questions about difficulty of the tasks, comprehensibility of the text and how pleasant the text was written. In addition, the Post-Study System Usability Questionnaire (PSSUQ) (scale 1 till 7) was completed for the app and the website. Lower scores indicate a better usability satisfaction. In the pilot all patients were interviewed three times.

After every stage, improvements to the app and website were mainly made to the layout. The content and structure has changed little. The mean score on the PSSUQ for the website improved from 2.4 (SD 1.3) to 1.5 (SD 0.5), for the app from 2.6 (SD 1.5) to 1.8 (SD 1.1).

In conclusion, the usability study resulted in a better fit between tool (both app and website) and intended users.

Keywords: physical activity, usability, mobile application

User Profiles of a Smartphone Application to Support Drug Adherence - Experiences from The iNephro Project

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Purpose: One of the key problems in the drug therapy of patients with chronic renal failure is drug adherence. In 2010 the initiative iNephro was launched (www.inephro.de). A "context sensitive" software to support regular and correct drug intake was developed for a smartphone platform (iOS). The present study investigates, whether and how such an application is deployed by smartphone users. Methods: Together with cooperating partners the mobile application "medication plan" was developed. Users are able to keep and alter a list of their regular medication. A memory function supports regular intake. The application can be downloaded free of charge from the iTunes App Store. After individual consent of users from 21.10.2010 to 04.02.2012 2,042,338 actions were recorded and analyzed from the downloaded applications. In 2,279 cases, demographic data were collected with a questionnaire. Results: Overall the application was used by 11,688 smartphone users, in 3,406/11,688 (29.1%) cases at least once a week for at least 28 days. 3,209/11,688 (29.5%) used the application at least 84 days. 1,554/2,279 (68.2%) of users surveyed were male, the stated age of all users was between 6-87 years (mean 44). 1,697/2,279 individuals (74.5%) declared to be suffering from cardio-vascular disease, 292/2,279 (12.8%) had a previous history of transplantation and 161/2279 (7.1%) suffered from diabetes mellitus. 1,568/2,279 (68.8%) of users were on <6 different medications, 201/2,279 (8.8%) 6 – 10 and 26/2,279 (1.1%) on more than 10. Conclusion: A smartphone application that supports drug adherence is already regularly used by chronically ill users with a wide range of diseases over a longer period of time. It appears that users apply the software temporarily as a learning tool.

Keywords: smartphone, drug adherence, user interest

Using a Touch Pad without Touching the Screen - Android Application for an Intuitive Increase of the Housing Environment

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Within the context of an ageing population, it is necessary to provide each and everyone with versatile widely-accepted applications for home control. We have started developing an intuitive pleasing application for persons with impaired mobility or conditions like Parkinson's disease. Our goal is to develop an application favouring the use of intuitive gestures to control home device switches (such as heating or lighting switches) in a natural way. This app makes use of the mobile interface built-in camera to recognize the labels which identify the type of switch and device currently targeted by the user. Once the device has been recognized, augmented reality displayed on the interface informs the user of the current state of the identified device (the current temperature in the room for instance, if it is a thermostat). Associated settings and controls are also displayed. Then, most home devices are either controlled by on/off switches or gradual cursors ranging from minimum to maximum state using the gyroscope. Simple motions applied to the interface (tilting it forward or backward, to the right or to the left) enable to slide the control up and down, thus increasing or decreasing the level of the corresponding device function. In technological terms, the habitat itself should of course meet the technical requirements needed so as to have its various devices controlled by a central system. State-of-the-art products, particularly in the field of home automation, are available on the market. Wired as well as wireless technologies are at our disposal to transmit command signals. Re-inventing home appliances or the way they are connected is definitely not the point. The novelty of our approach lies in the fact that the interface is, for the user, the entry point into the whole system, that is to say the entire environment he lives in. As regards ethics and sociology, ubiquity is a crucial aspect for the user to perceive his assistance as a natural extension of his gestures and way of life. Unintrusive low-pressure features are parameters which will prove to be essential when it comes to appropriation and pleasurableness of the system while using its interface.

Keywords: Touchpad, housing environment, android, intuitive

Validation of Wi-Fi Communication between Multiparametric Patient Monitor and eHealth Management Platform: A Case Study

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eHealth applications, especially based on wireless technology, have enabled the provision of better care to hospitalized patients. However, the use of wireless communication technologies in medical devices has brought with it new challenges for ensuring the quality and reliability of data management. The aims of this study were: (1) to validate the Wi-Fi communication between a multiparametric patient monitor and an eHealth Management Platform in a hospital environment; (2) to determine the best protocols and technologies to be used for data exchange with minimum connection problems and packet loss. The validation process was divided into a hospital environment evaluation and communication performance tests. Initially, the number of concurrent local Wi-Fi networks and equipment placements were evaluated in relevant areas of PUCRS University Hospital, Porto Alegre, RS, Brazil. In view of these findings, a comparative study analyzed the data exchange performance using different equipment configurations between a LIFEMED Lifetouch10 multiparametric patient monitor and a Linksys access point, which was connected to the LIFEMED eHealth Management Platform. The monitor was positioned in a laboratory environment placed 6 meters apart from the access point, having no physical obstructions in-between and the Wi-Fi networks operating concurrently. The data exchange was analyzed using the software WireShark®. The hospital environment evaluation found a maximum of 3 concurrent Wi-Fi networks in the relevant departments, however, it was decided to broaden the application of the proposed study by testing 12 concurrent networks. The comparative study demonstrated a significant reduction in connection problems and packet loss when using Wi-Fi

communication at a 802.11G standard. In addition, the data exchange quality was improved by using TCP protocol instead of UDP protocol, and with the selection of the channel with the lowest concurrent networks. The proposed configuration enabled the correct visualization of patient physiological information at the Central eHealth Management Platform, with minor flat line events due to connection problems or packet loss.

Keywords: Wi-Fi, Lifetouch10, e-Health

Validation of Photo-ECG for Remote ECG Analysis

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Introduction: Tele-ECG, a Telecardiology tool, has been receiving increased attention from the scientific community due to its potential for diminishing the high incidence of deaths associated to heart disease. However, the high cost of a large-scale deployment of this tool makes the development of alternative methods essential for the acquisition and transmission of electrocardiogram data.

Objective: The present study aimed to evaluate the efficacy of photographed ECGs (Photo-ECGs) sent over the internet for interpretation by two remote physicians.

Methods: A Photo-ECG acquisition methodology was defined during pilot studies, generating a protocol to be followed by the physicians. Three hundred and one paper ECGs were photographed twice (n=602), using a Canon digital camera (0.3 megapixel resolution) and a Nokia mobile phone with integrated camera (2.0 megapixel resolution). These Photo-ECGs were then randomized, encrypted and sent (single-blind) to the physicians by email together with an evaluation form, containing gender and age only, while paper ECGs were delivered personally without randomization.

Results: Concordance between results of the paper ECGs and their respective Photo-ECGs were evaluated by the weighted Kappa, giving an average $K = 0.5075$ for the camera Photo-ECGs and an average $K = 0.5106$ for the mobile phone Photo-ECGs. The paper ECG results from each physician were also compared ($K = 0.3512$). Out of the 602 ECG pictures, physicians interpretation (n=1204) differed from the paper ECGs in 204 cases when analyzing camera Photo-ECGs and in 214 cases for the mobile phone Photo-ECGs. Of these cases, they reported difficulties in interpreting the ECG images of 11 out of 204 (5%) and of 210 out of 214 (98%).

Conclusion: The results of this study suggest that the Photo-ECG has potential for allowing virtual evaluation of ECGs to take place using commonly available and low cost equipment.

Keywords: Photo-ECG, Telecardiology, Validation, eHealth, Telemedicine.

Validation of the Telehealth Services Code of Practice for Europe

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The “Telehealth Services Code of Practice for Europe” project is funded under the European Commission (EC) Programme of Community Action in the Field of Health. The project reflects the desirability of the EU and the EC of defining the standards and a "Code of Practice" at European level for telehealth services. The first draft of the Code was released in April 2012. The paper outlines the progress of the project since then, i.e. the validation of the Code in 5 European countries.

Value Analysis to Outline the Future of Robotics in Healthcare - PRAMAD Project

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This work was produced as part of PRAMAD (Robot Platform for Ambient Assisted Living), a collaborative project supported by the national 'competitiveness cluster' for digital content and services 'Cap-Digital', whose robotics community is addressing the subject of Robotics and Smart Objects. The purpose of the PRAMAD project is to propose an economically-viable concept for a service robot mainly designed for persons experiencing loss of autonomy with the objective to facilitate their life staying at home. PRAMAD is a joint project between: ROBOSOFT manufacturer, BROCA Hospital, ORANGE Labs, INRIA (French National Institute for Research in Computer Science and Control), ISIR laboratory (Institute for Intelligent Systems and Robotics), WIZARBOX (French video game development company) and COVEA Insurance group. The ambient assisted living robots for elderly and people in loss of autonomy is planned to become a fast growing market in the coming years. These robots aim firstly to meet the future needs of dependent elderly people and their caregivers but also and secondly to "reinforce" the ambient assisted living ecosystem with the objective to improve its effectiveness. Under these circumstances, a home care service with robot assistance is therefore being presented as an appropriate solution for persons in loss of autonomy but not medically dependent. A value analysis has been carried out in order to get an insight of potential user's needs and the utility of robot's functions for the final user. The aim of the Value Analysis method is to design a product or service that optimally meets user needs. First of all, PRAMAD partners agreed on a total of 130 delivery functions organized into eight basic functions, along with three constraint functions. These functions served to conduct a survey including two target groups: “elderly in good health at home” and “elderly sick at home”. This paper analyzes and discusses the findings of the survey.

Keywords: Homecare, Robotics, eHealth, Value Analysis

Virtual Reality Platform for Simulate Bariatric Surgery and Predict Patient Evolution

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Obesity is considered the first cause of death after smoking causes. Obesity could lead to the development of comorbidities such as diabetes, hypertension, heart disease... When it comes to Morbid Obesity (MO), complications are more severe; they occur in a shorter period of time and come associated with a decrease in the quality of life. Medical treatment combines dietary, pharmacological or psychotherapeutic techniques. But in the vast majority of cases with MO, surgery is the most recommended treatment. It is estimated that 400,000 bariatric surgeries are performed every year in the world. Nowadays, it exists several Virtual Reality platforms for surgery simulation that generate 3D organs reconstruction, however none of these are specifically designed for Bariatric Surgery and they use generic models instead of real images taken from the patient. The Bariatric Surgery Project is a multidisciplinary project designed and executed by health care professionals and e-Health researchers that proposes to develop a Virtual Reality platform to support surgeons to prepare and perform the surgery as well as estimate patient's evolution. More precisely, the platform would be able to generate a 3D patient's stomach model allowing the surgeon to prepare the Bariatric Surgery in advance and estimate patient's weight loss, based on patient's physiological characteristics and sex, in order to improve care and system's efficiency. The system will retrieve the patient's abdominal TACs from the PACS, from these TACS the system will generate a 3D representation of the patient's stomach. The platform allow the physicians move the 3D model, zoom it, decompose it and finally plan the real surgery, simulating it over the 3D model. Also, the platform will incorporate heuristic models providing a prediction of the patient's weight loss. Currently we are working on capture patients for the study and a first prototype of 3D stomach reconstruction. This project is an initiative with three Spanish institutions, T-Systems which develops the Virtual Reality Platform, Sant Pau Hospital which validate Clinically the System and i2CAT Foundation which implement interoperability with HC systems

Keywords: Virtual Reality, 3D, Bariatric, Surgery

WEB 2.0 and M-Health Convergence

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The aim of this paper is to discuss the potential effects of an operational convergence between Web 2.0 and the latest mobile technology, evaluate possible beneficial impact of a deployment on working health care and clinical facilities. The use of web technologies by health consumers started in the beginning of previous decade with the AOL Web 1.0 world in which community users supported and online participation on searching and data mining of relevant clinical information as a part of a 'PatientLikeMe' modality. Very quickly the online social-media networking has evolved into the Web 2.0 environment. In 2004 at the first Web 2.0 conference was promoted the idea of Internet as a participatory platform rather than a mere collection of static pages, gaining the rule of empowering, creating, educating consumers and providers to use this platform for health information and support.

Today the development of mobile technologies allows the creation of new paths and networks for sharing data and applications using wireless connection mode, offering portable, real-time, communication and information access for people who previously had little or no access to affordable communication channels. These technologies are offering a new communication modality between people and health institutions, gaining a greater access to public information and basic services for all.

The 'technology convergence' Web 2.0 and M-Health, becomes an issue to be considered as primary element for designing "next future health facilities", in order to reach a *patient-centric care anywhere* situation.

While interaction between Web 2.0 applications and mobile technologies offers an effective tool for empowering and supporting clinical activities, it requires focusing on the new skills and knowledge needed to demolish the still dominant conservatism in healthcare.

To assess the impact of these new opportunities on hospital was structured and implemented a survey involving physicians, technicians, nurses and administrative staff in Parma University Hospital. The result of this review suggests to set out an important and complete training phase considering a reasoned deployment to m-Health.

Web-Based Psychosocial Care for Patients with Implantable Cardioverter Defibrillators

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The implantable cardioverter defibrillator (ICD) is indisputably successful in its medical purpose for primary and secondary prevention of potentially lethal ventricular tachycardia and ventricular fibrillation. Despite many ICD-patients suffer from psychosocial complications like anxiety (up to 87 %), anxiety disorders (up to 38 %) and depression (up to 30 %). Routine medical care often lacks resources to implement psychosocial care. If available a lot of ICD-patients cannot take advantage of the care due to their limited mobility. Therefore, delivering the intervention to their homes via internet seems to be an ideal alternative. Methods: We have developed ICD-Forum, a six-week internet based prevention program providing technical and medical information regarding the ICD and cognitive-behavioral-therapy based self-help materials in order to prevent anxiety and depression and to improve quality of life. Integrated in this program is a professionally moderated virtual self-help group. This program is currently being evaluated on a larger scale in a multi-center, multi-disciplinary, half-open, part-randomized, controlled clinical trial. Demographical, explicit and implicit psychological, physiological and medical variables are collected over a period of one year. We aim at a sample size of 200 patients. Results: Data from a pilot study shows promising effects on measures of anxiety and avoidance behaviors. With a large heterogeneous sample we believe we will be able to evaluate the effectiveness and efficacy of ICD-Forum. A critical evaluation of these data allows for deducing recommendations for the implementation of future internet-based psychosocial programs for ICD-patients. Conclusions: We believe that web-based psychosocial care can be efficacious and effective in reducing anxiety, depression and increasing quality of life of ICD-patients. It offers unique advantages, recommending them for broader use as a complementary measure to traditional approaches. Prior to this, we believe that it can advance psychocardiological patient management by combining it with tele-health approaches to bring interdisciplinary care directly to the patient.

Keywords: ICD, anxiety, depression, web-based care

What does it take to Lead in Telehealth? A Vision for the Future

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Home Telehealth has been tested since the 1980s and systems have been commercially available since the early 1990s. The benefits have been widely proven but implementation has been small (with some exceptions). What will it take to lead this market forward and what might it look like in the near (5-10year) future? This presentation explores these issues, cites leading programs

from a variety of different countries / healthcare systems and presents what must be done to lead. It also presents an example of what the future might look like.

Witelm: A Foundation to Support Telemedicine Practice

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Teleconsultation is the core procedure in telemedicine. Necessary tools and networks are now reliable and economically affordable. Time has come to establish a comprehensive multi-lingual system, in order to address the needs of demanding patients. The first stage of the « teleconsultation rocket » was technical in nature; the second stage will be powered by human resources.

There are several difficulties to overcome:

- Language barriers,
- Ethical, societal, cultural aspects,
- Legal procedures and consequences,
- Physician's and other provider's compensation.

WITELM, an acronym for World Institute for TELeMedicine, is an international Foundation designed to enhance the development of telemedicine. As a French initiative, based in Strasbourg - officially established as a European city – the Foundation has been mostly focused at first on providing services in French language. However, from the very beginning, it has been open to other Founding Members and partners, either public or private. Academic and entrepreneurial teams from Texas, renowned for their indisputable experience, are initiating the English-speaking chapter. The goal of this presentation is to further expand the perimeter, all over the world. ISfTeH, STEeS and ATA are privileged places to consolidate these early efforts into a consistent international community.

Wrist-Worn Wearable Pulse Oximeter for the Remote and Continuous Health Monitoring Without Fingertip Sensor

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Photoplethysmography is the main technique utilized to measure pulse oximetry signals by analyzing the pulsatile components of the detected red and infrared light. Conventionally, this method makes use of transmitted and reflected light intensities. The major practical limitations of pulse oximetry at the wrist are the comparatively low-level and corrupted photoplethysmographic signal resulting from the low-density vascularity of the skin, and high motion artifacts. We discovered that there is a unique location on the wrist that never has been explored by others, and we developed a unique optical sensor using a trans-illumination configuration that results in a dramatic increase of the signal. In addition, a complementary dynamic light scattering (DLS) sensor was exploited for pulsatile blood flow measurements and pulse rate recovery at low perfusion situations. Physiological signals from both sensors were processed using a unique correlative algorithm. As a result, we were able to obtain an AC/DC ratio of around 0.5% whereas any other standard reflection configuration yields only 0.02-0.05% at the wrist. It should be noted that an AC/DC ratio of 0.5% is not far from the commonly accepted 1-1.5% for the fingertip transmission signal. The fully functional prototype with Bluetooth transmission and smartphone application was built and verified in more than 100 clinical tests. The correlation between Oxitone and benchmark pulse oximeters was 0.91 ($p=0.0001$). Oxitone end users include COPD and asthma patients, OSA and CHF patients and elderly people requiring long-term care facilities at home or at points-of-care. The Oxitone wrist-worn pulse oximeter is the world's first wearable

health monitor allowing comfortable and non-distracting continuous monitoring throughout daily activity.

Keywords: wrist, wearable, oximeter, monitoring, preventive

XX International Training Course “Modern Aspects of Telemedicine” (Conclusions)

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From November 20 till November 30, 2012 the Russian Association for Telemedicine (RAFT) together with its partners held the XX-th International training course called "The Modern Aspects of Telemedicine". This course included 50 attendees, some of them arrived from remote regions of Russia such as Magadan, Nadym, Novy Urengoy and others. Within 10 days of training leading experts from countries where telemedical technologies are extensively used (such as The Russian Federation, Italy, India, Brazil, the USA, Great Britain, etc.) held lectures and workshops. The course program included the following topics: - establishing telemedical centers, - distant videos consultations for difficult patients, - interactive teletraining - master classes on the latest medical technologies, - home care telemedicine, - economy and telemedicine marketing, - terrestrial and satellite communications, - stationary and mobile telemedical complexes. As usual the presentation ISfTeH's role in international cooperation in telemedicine given by Mr. Frank Leivens of ISfTeH, our close friend and partner, arouse avid interest. Our presentation will provide a comprehensive overview of our twelve year experience in organizing international telemedical courses, and will cover the following aspects: - developing training program and the annual changes made in it; - setting up a group of attendees and developing marketing strategy; - geography of the course attendees and changes in the project from year to year; - influence of new technologies on choice of topics included in the course; - interaction with course graduates who have created new telemedical centers; - school financing, cooperation with sponsors. We hope that our unique experience will become part of ISfTeH knowledge base. We suggest our experience is used for establishing the all-European School for Telemedicine within Med-e-Tel or another ISfTeH agency. Such course can be instrumental in training professionals for remote regions of Europe, Asia and Africa.

Keywords: International, training, course, experience, telemedicine

Youth Multimedia On-Line Engagement in Kenya

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Young people in Kenya are collaborating, sharing and connecting on-line through multimedia on-line platforms that has given them hope for their dreams and future aspirations in life. These platforms have been extensively customized for Mobile environments since this is the mainstream point and medium of access to many. Among issues addressed include but not limited to Girl Empowerment, Economic Development Opportunities, Drugs and Substance abuse, Social Issues including relationships, HIV/AIDS related activations that lead to uptake of reproductive health services. All this is achieved through a revolutionary and innovative youth lifestyle brand 'G-PANGE' (which is a swahili word that means, put your house in order OR Sort yourself Out) that was developed by the youth for the youth. These Multimedia On-line engagements are complemented with the various Implementing Partners on the ground who offer the services to the youth in partnership with 'G-PANGE'. They also supplement the on-line engagements with field events and toll free counselling services to Increase uptake of quality and timely youth centred

prevention services as we Leverage audience networks to facilitate information sharing to Expand reach to include broader, more diverse audiences. The Multimedia Platform ultimately provide youth with Personalized Information that reinforce health and socio-economic messages through experience sharing and support among peers. Among the Channels used include Websites, Wap/Mobi-Sites, Popular Social Media Sites(Facebook, Twitter, YouTube), SMS Short Codes, USSD Sessions and Toll Free Lines. Visit <http://www.g-pange.com> to crawl our web presence.

Keywords: Economic-empowerment, Reproductive-Health, Girl-Empowerment, Digital-Engagement, Youth-Focus,