International Society for Telemedicine and eHealth-ISfTeH

In partnership with

The Polydisciplinary Faculty of Nador-FPN

University Mohamed VI for Health Sciences-UM6SS

Moroccan Society for Physicians Abroad-C3M

The Moroccan Society for Telemedicine and eHealth-MSfTeF

Organize

The 22nd International conference on Telemedicine and eHealth

December 6-8, 2017

Novotel Hotel, Casablanca – MOROCCO

meHealth 2017
Conference Presentation

The aim of the MeHealth 2017 conference in Casablanca (i.e. the conference of the MSfTeH) and the "22nd ISfTeH International Conference" is to present practical experiences and research results in the field of Telemedicine and eHealth solutions, and to provide opportunities for healthcare providers, industry representatives, policy makers, researchers and scientists to meet, share and discuss current projects, research, and new concepts and ideas in Telemedicine, Telehealth and m/eHealth.

The use of Telemedicine and eHealth technologies represents a real opportunity to enhance patients' quality of life and reduce healthcare costs. However, it faces important challenges related to data ownership and patient privacy, healthcare professional's commitment, patient's adherence, integration into routine care, financial and reimbursement aspects and more.

Attend the MeHealth 2017 conference to share information about your own projects and initiatives and to learn from others. MeHealth 2017 will bring together members of the International Society for Telemedicine & eHealth and a wide range of other local and international institutions and organizations who are involved in Telemedicine/eHealth development and implementation.

Frank LIEVENS, Samia CHAKRI, Samir KADDAR, Karim OULDIM, & Hassan GHAZAL
Chairs of the conference
http://www.msfteh.org/mehealth2017/

Conference Topics
Electronic medical record / personal health record
Health information systems and patient smart cards
Standards and interoperability in Health Informatics
Telemedicine, Teleconsultation, Telemonitoring
Telecardiology, teleophthalmology, Teleradiology, Telepathology, Teledermatology, Teleoncology
Telehomecare and Ambient Assisted Living, Telerehabilitation
Telemedicine and tourism
National e-Health roadmaps
eHealth and eGovernment
Education in Telemedicine
Legal and social issues in Telemedicine
Economical issues in Telemedicine
Medical Image Processing and Techniques
Mobile Health and online community
Mobile-Based Diagnosis
Internet of Things, Big Data and Data Analytics
Patient safety, privacy and security
Internet in healthcare, medical web portals
Web 2.0 applications
Distance learning in healthcare
Decision support systems & expert systems in medicine
Bioinformatics and genomic data banks
Statistical software
NeuroInformatics, A.I. and cognitive brain processes
Neural networks in biomedicine
Semantic web and ontologies in medicine
Knowledge management, knowledge-based systems
Modelling and simulation
GNU health

Welcome address

Dear Attendees,
Welcome! On behalf of the organizing groups, namely the International Society for TeleMedicine and eHealth, The Polydisciplinary Faculty of Nador, The University Mohamed VI of Casablanca, The Moroccan Society for Physicians abroad, and the Moroccan Society for Telemedicine & eHealth, we are truly happy you have chosen to join us in Casablanca for the 22nd International Conference on telemedicine and eHealth, 2017. We are deeply grateful to all other partners for endorsement of this event.
Over the course of the conference, you will have the pleasure of experiencing number of outstanding keynotes, over 50 talks and posters. This year's scope includes a special focus on issues relevant to African countries for their engagement in Telemedicine and ehealth. May you enjoy the next three days with exciting talks, contemporary science, and take full advantage of the ample networking opportunities. Special thanks go to Prof. Andy Fisher, President of the International Society for TeleMedicine and eHealth, Frederic Lievens, Executive manager of the ISfTeH, Prof. Azdi Moussa Ali, Dean of the Polydisciplinary Faculty of Nador, and Pr. Nejjari Chakib, President of the University Mohamed VI for Health Sciences, who fully supported the organization of this edition.
ISfTeH Telemedicine and eHeath international conference series is dedicated to providing high quality meetings to the scientific community. We believe each individual on the organizing committee has helped advance this mission. We thank them and our sponsors for their commitment and devotion. Finally, the entire Moroccan Medical and Medical Informatics community has enthusiastically welcomed the guests to Casablanca city and fully embraced what we are trying to achieve. We encourage you to extend your personal words of appreciation and recognition to both the hosts and participants, with special thanks to the organizers from other countries who have helped for the course of the last 6 months, to build the conference program and components.

Together with our partners and sponsors, we encourage you to make the best of every learning & networking moment and of every part of the conference talks and discussions. An opportunity like this to share uptodate science in such a wonderful setting does not happen every day!

Sincerely,
Ghazal Hassan, Oudim Karim, Lievens Frank, Chakri Samia, Kaddar Samir, *chairs*
On behalf of local organizing committee, 6 December, 2017

Dear Conference Attendees,
We welcome you to Casablanca for the 22nd conference on Telemedicine and eHealth. To have this conference in Morocco is testimony of the dedication of the ISfTH community to advance its agenda in the African continent and the Arab world. The Program Committee would like to express its gratitude to the local hosts for facilitating the organization. Over months, the Program and Scientific Committees have worked to process invitations for keynote speakers, to manage paper' submission and evaluation, to organize the technical program, to prepare the material for the conference, among other things. This was a team of dedicated volunteers who accepted to take this responsibility, in addition to their already full agendas and busy personal lives. We would like to thank all the ones known or behind the scene that were leading the hard work. Please forgive if we do not cite the names as the list is quite long. On behalf of our societies and institutions, we say thank you to all of you.

Andy Fisher, *Honorary Chair, On behalf of the Program Committee*

Content Table

SPEAKERS

Dr Najeeb Al Shorbaji is Vice-President for Knowledge, Research and Ethics e-Marefa (www.e-marefa.net), Amman, Jordan Former Director of Department of Knowledge Management and Sharing, World Health Organization (WHO) Has been working as Director, Department of Knowledge Management and Sharing at the World Health Organization Headquarters (WHO/HQ) in Geneva since September 2008 till 2015. Prior to that he held the posts of Information Scientist, Regional Advisor for Health Information Management and Telecommunication and Coordinator for Knowledge Management and Sharing at the WHO Eastern Mediterranean Regional Office since February 1988. He is from Jordan, and holds a PhD in Information Sciences since 1986. Dr Al-Shorbaji's portfolio covered WHO publishing activities and programmes, library and information services, knowledge networks, eHealth, knowledge translation and WHO Collaborating Centres. Through his career in WHO, he initiated and lead a number of information and telecommunication technology projects and knowledge networks. He is a member of a number national and international professional societies and associations specialised in information management and health informatics. He has authored over 80 research papers and articles presented in various conferences and published in professional journals.

Prof. Peter J Tonellato, PhD is Director of the Laboratory for Personalized Medicine and Senior Instructor, Department of Biomedical Informatics (DBMI) and Department of Pathology, Brigham and Women's Hospital and Harvard Medical School, Boston, MA and Professor, Bioinformatics, Zilber School of Public Health, University of Wisconsin, Milwaukee WI, USA. Dr. Tonellato joined DBMI (then Center of BMI) in 2007 after completing a stint as CEO of POINTONE Systems, the personalized medicine software company he founded in 2001. Previous to POINTONE, Dr. Tonellato was Associate Professor of Mathematics at Marquette University (MU) and then Founding Director of the Bioinformatics Research Center at the Medical College of Wisconsin (MCW), 1997-2004 and of the joint MU-MCW graduate program in bioinformatics. At DBMI, Dr. Tonellato created the Laboratory for Personalized Medicine to focus on research, development, and translation of clinical, physiological, and genetic knowledge to the benefit of health care. Dr. Tonellato has worked in the area of biomathematics, computational biology, and biomedical informatics since completing his degree in applied mathematics at the University of Arizona in 1985.

Luis Falcon, M.D., B.Sc, holds a degree in Computer Science and Mathematics from the California State University (USA) and in Medicine from IUCS, Buenos Aires (Argentina). Dr Falcon is a social, animal rights and free software activist. He is the founder of GNU Solidario, a nonprofit organization that delivers Health and Education with Free Software. Dr. Falcon is the author of GNU Health, the award winning Free/Libre Health and Hospital Information System. He is a guest speaker at national and international conferences about Free Software, eHealth and Social Medicine. Dr Falcon currently lives in the Canary Islands, Spain.

Prof. Francesco Sicurello has Degree in Physics (Electronics and Cybernetics), with many years of experience (from 1978) in Medical Informatics, Telemedicine, e-Health and statistical software for data analysis in epidemiology and biomedicine. He is president of IITM (International Institute of Tele-Medicine) / Italian Association of Telemedicine and Medical Informatics (@ITIM). From 1999 till now he is professor of Medical Informatics and Telemedicine at University of Milan-Bicocca. From 2007 to 2012 professor of Ontology and its applications at University of Insubria (Como). From 1996 to 1999 professor of Electronic Documents at University of Macerata. From 1984 to 2001 professor of Informatics applied in Medicine and Statistical Software at University of Milan. From 2004 to 2014 he had been Coordinator of Technological University Centre of Desio (MB). Since 2000 to 2012, he was referent for Telemedicine in the Scientific and Technological Cooperation of Italian Ministry of Foreign Affairs. He was expert in health informatics and head of operating unit (2001-2008) at the Health General Directorate (Research and Innovation Office) of Lombardia Region.

For about 10 years (1990-1999) he had been Head of a Research Operating Unit of Medical Informatics at Institute of Biomedical Technologies at National Council of Research in Milan. For 5 years (1996-2000) he was director of Informatics Service at National Institute of Neurology in Milan. He also worked as responsible of medical informatics and data analysis in hospitals as Policlinic of Milan, Desio Hospital. From 1978 to 1986 he was designer, developer and responsible at Desio Hospital of epidemiological medical information system in the frame of the health and epidemiologic surveillance program of population involved in the dioxin environment disaster in the Seveso city area (at north of Milan). His activity consists on studies and designs of Health/Hospital Information Systems, computerization of medical record and clinical database, statistical software applications and artificial intelligence techniques in bio-medicine (expert systems, artificial neural networks, etc.), Telemedicine systems, telecare services, web sites and portals in medical applications. He is responsible of several research projects on Medical Informatics and Telemedicine, involved in Italian, European and International R&D Programmes. He is author of around 400 publications (national and international) in Medical Informatics, Telemedicine and software for data analysis and mining, artificial neural networks, Neuroinformatics and Artificial Intelligence, knowledge management and ontology.

Dr. Zakiuddin Ahmed (MD, MBA), A visionary strategist, healthcare entrepreneur & a physician advocate who specializes in developing socially beneficial, sustainable& innovative solutions in Healthcare through information technology with a Patient Centric Focus.
His areas of interest, expertise & experience are: eHealth, mHealth, Telemedicine, Digital Health, Patient Safety & Healthcare Quality, Ethics, Digital Marketing in Healthcare, Clinical Research and Healthcare Leadership.
His current leadership positions include

- President, eHealth Association of Pakistan (eHAP)
- President, Healthcare Quality & Safety Association of Pakistan (HQSAP)
- President, OPEN Karachi
- Country Representative, HIFA

Dr. Zakiuddin Ahmed holds following positions:

1. President, Healthcare Quality & safety Association of Pakistan
2. Project Director, Riphah Institute of Healthcare Improvement & Safety
3. Secretary Health Research & Advisory board, HRAB

4. President, Healthcare Paradigm
5. Director Digital Health, PharmEvo
6. Project Director RAH@H, King Saud University, Riyadh
7. Project Director RAHAT, Bin Qutub foundation
8. CEO, Medical Voice
9. CEO, Digital Care

Conference General Schema

WEDNESDAY 6.12			
MORNING			
ROOM	ROOM 1	ROOM 2	ROOM3
WORKSHOPS	WS1:DIGITAL HEALTH	WS2: GNU HEALTH	WS3:BIOINFOTRMATICS
CHAIRS	S. Moustakim S. El Kasmi	A. Elkafil S. Chaqsar	K. MARZOUKI N. AZZA
AFTERNOON			
15.30-17.00	OPENING CEREMONY – CHAIRS : GHAZAL/OULDIM		
17.00-18.00	KEY NOTE SESSION 2 – CHAIRS : KAMAL MARZOUKI / FREDERIC LIEVENS		
18.00-20.00	RECEPTION		
THURSDAY 7.12			
MORNING			
9.00-10.30	KEYNOTE SESSION 3 – CHAIRS : PIRKKO KOURI/NAJEEB SHORBAJI		
11.00-12.30	PARALLEL SESSIONS I		
ROOM	ROOM 1	ROOM 2	ROOM3
SESSION	S1.1 HEALTH INFOSYST	S1.2 INTELLIGENT SYST	S1.3 MOBILE HEALTH
CHAIRS	LUIS FALCON Laila Chiadmi-García	ANDRE PETITET Samir Kaddar	Adolfo Sparenberg Osman Ly
AFTERNOON			
14.00-16.30	PARALLEL SESSIONS II		
ROOM	Room 1	Room 2	Room 3
SESSION II	Startathon	SII1.TELEMONITORING	SII.2 FELSI
CONENT	website	below	below
CHAIRS	Abderahman El kafil Sapha Mostakim	Claudia Bartz Ouldim Karim	Masatsugu Tsuji Abdellatif Elouahabi
SPECIAL SESSION 16.30-19	Plenary: Telemedicine for Africa		
CHAIRS	Yunkap Kwamkam/Frederic Lievens		
20.00	Diner Gala		
FRIDAY 8.12			
MORNING			
9.00-10.30	KEYNOTE SESSION 4		
11.00-12.30	PARALLEL SESSIONS III		
ROOM	ROOM 1	ROOM 2	ROOM 3
SESSION III	S3.1.Education	S32.Teleconsultation	S33.National Programs
CHAIRS	Pirkko Kouri Dan Gerendasy	Chakib Nejjari Andy Fisher	Yunkap Kwankam Najeeb Shorbaji
AFTERNOON			
14.00-15.00	Closing Ceremony : General Discussion and Recommendations		
15.00-19,00	SOCIAL PROGRAM : VISIT OF CASABLANCA		

TECHNICAL PROGRAM

Wednesday, December 6			
08.00	Welcome and Registration		
Morning	Satellite Workshops		
9.00 to 12.00	SW1: Digital Health	SW2 : GNU Health	SW3: Bioinformatics
Room	Room 1	Room 2	Room 3
Chairs	S. Moustakim S. El Kasmi	A. Elkafil S. Chaqsar	K. Marzouki N. Azza
	Part I	Part I	Part I
10.30	Coffee Break		
	Part II	Part II	Part II
12.30	Lunch		
Afternoon			
15.30	Opening Ceremony (Chairs : Pr. Hassan Ghazal / Pr. Ouldim Karim)		
	▪ **Prof. Hassan Ghazal**, Chair, FPN/UMP, MSfTeH/ISfTeH ▪ **Prof. Karim Ouldim**, CoChair, UM6SS, Casablanca ▪ **Dr. Andy Fisher**, President of the ISfTeH ▪ **Dr. Chakib Nejjari,** President of the UM6SS ▪ **Prof. Abdelkhalek Legssyer**, Vice-President, UMP, Oujda ▪ **Prof. Ali Azdi Moussa**, Dean, Pluridisciplinary Faculty of Nador ▪ **Prof. Abdelkrim BAHLAOUI**, Dean of The School of Medicine, UM6SS, Casablanca ▪ **Prof. Samir Ahid**, Dean of the School of Pharmacy, UM6SS, Casablanca ▪ **Prof. Fatima Dehbi,** Dean of the School of Sciences and Health Professions ▪ **Dr. Samir Kaddar**, President of the Association of Moroccan Physicians Abroad (C3M), Belgium ▪ **Mrs. Samia Chakri**, Director, Maroc Digital, Ministry of Industry, Trade, Investment and Digital Economy ▪ **Dr. Ahmed Boudak**, Director of the Hospitals, MoH ▪ **Prof. Abderrahman Maaroufi**, Director, DELM, MoH ▪ **Dr. Najeeb Al Shorbaji,** Former Director, WHO, Knowledge Sharing Department ▪ **Mr. Anouar Yadini**, President, Moroccan Association of Medical Materials Distributors ▪ **Prof. Youssef El Fakir**, President of the Moroccan Society of Radiology/Vice President of the Moroccan Federation of the Medical Imagery and Interventional radiology ▪ **Prof. Francesco Sicurello,** President, EMMIT/IITM ▪ **Dr. Dan Gerendasy**, Chief officer, International Cooperation, US NLM/NIH ▪ **Prof. Mohamed Benlemlih**, Dean, Faculty of Sciences, Fes ▪ **Mr. El Hassan Lemallem**, Director, School of Information Sciences, Rabat ▪ **Arch. Pierapolo Saporito**, President of OCCAM – UN affiliated ▪ **Dr. Ahmed Zakiuddin**, former President, eHealth Pakistani Association ▪ **Dr. Ousmane Ly**, General Director, National Agency for Telehealth and Medical Informatics, Ministry of Health, Mali ▪ **Dr. Luis Falcon**, President, GNU Health Solidario ▪ **Dr. Hanae Cherradi**, Vice-President of the Moroccan Society of Telemedicine and eHealth ▪ **Prof. Mohammed Bennani Othmani**, President of the Moroccan Society of Medical Informatics ▪ **Dr. Robin OHANNESSIAN**, Director, Telemédecine 360, France ▪ **Mr. Saad Chaabi**, President, International Federation of Medical Students (IFMSA)-Morocco ▪ **Prof. Peter Tonellato**, Director, Lab for Personalized Medicine, Harvard Medical School, USA		
17.00	Keynote Session 2 – Chairs : Kamal Marzouki/Frederic Lievens		
	KS1: Mr. Frank Lievens: Telemedicine Where are we?		

	KS2: Dr. Eric Bacon: The Evolution of Telemedicine Technology **KS3 : Samia Chakri** : Moroccan Digital egov strategy and Health		
18.00	Reception		
Thursday, December 7			
Morning:	Health Information Systems- intelligent Systems- mobile Health		
Keynote Session 3 – Chairs : PIRKKO KOURI/NAJEEB SHORBAJI			
09.00	**KS4 : Al Shorbaji Najeeb** : eHealth National Policies		
09.30	KS5: **Mustapha Zghoumi :** eHealth as major component for national digital Strategy		
10.00	KS6: **Anissa Berbich** : Digitalization of the Human Capital management in health care		
10:30	KS7: **Abdellatif El Ouahabi** : Telemedicine and intellectual property		
11	Coffee Break		
Parallel Sessions I			
Room	Room 1	Room 2	Room 3
Session I	S1.1 Health InfoSyst	Intelligent Systems	Mobile Health
Chairs	Luis Falcon Laila Chiadmi-García	ANDRE PETITET Samir Kaddar	Adolfo Sparenberg Osman Ly
1130-13h Room 1:	Session I.1: Medical Data Bases and Health Information Systems (ChairS: Luis Falcon / Laila Chiadmi-García)		
	1) Blockchain Technology in Healthcare-Step forward into healthcare interoperability with IoT distributed data Dean Rakic 2) Integrating heterogeneous health records Sanae Maazouz 3) Towards Interoperable Health *Records* Juha Puustjärvi/Leena Puustjärvi 4) eHealth Interoperability Challenges and opportunities for Botswana integrated patient management system ((IPMS) Kagiso Ndlovu 5) Information system for a National newborn screening program Kamal Marzouki/ Souad Chaqsar 6) Moroccan Colon Cancer Database Souad Chaqsar/ Imane Allali		
11-12:30 Room 2	Session I.2: intelligent Systems and e-Health Chairs: Andre Petitet/Samir Kaddar		
	7) A new approach for diagnosis of diabetic retinopathy Kaoutar Lamrini Ouahabi/Mohamed Atounti 8) Using the Haddon Matrix to Understand the Role of Disaster e-Health Richard Scott/Maurice Mars 9) Selfie Telemedicine: A Review of the Future? Maurice Mars 10) The Development of an Evidence-Based Teledermatology Scale-Up Framework and Roadmap Laticha Walters 11) Security Concerns in the Use of Instant Messaging in Healthcare Chris Morr 12) Telemedicine: Let us have to worry about the consequences of cyber attacks? Andre Petitet 13) Data security and encryption of patient data transferred using the example of mobile devices and diabetes Anna E. Schmaus-Klughammer 14) Primary Immunodeficiencies on smartphone: A new app for PID Classification Leila jeddane / Aziz Bousfiha 14.bis) COSMETIC PRODUCTS: ANALYSIS OF TRENDS THROUGH KNOWLEDGE Laila Chiadmi-Garcia		
11-12:30 Room 3	Session I.3: – Telemedicine and mobile Health ChairS: Adolfo Sparenberg /Osman Ly		
	15) Utilization of mobile short message service to enhance uptake of focused ante		

	natal care among rural women Eliphas Gitonga 16) Mobile Health Apps for mental and physical disabilities Hayat Sedrati 17) Childbearing women's perception about the use of mHealth for mental health information in rural communities, Ile-Ife, Nigeria Titilayo Odetola 18) Telehealth Nursing Research – Review of Literature 2017 Claudia Bartz 19) Mobile Teledermatology in Sudan Faisal M. Fadlelmola 20) A mixed methods systematic review of success factors of mhealth and telehealth for maternal health in Sub-Saharan Africa Mohamed Ali Ag Ahmed 21) A Systematic Review of Patients Adoption of mHealth in the Developing World. A Proposed Model Michael Addotey-Delove		
Thursday, December 7			
14.00-16.00	Startathon –Devices & Telemonitoring – FELSI in Telemed		
Room	Room 1	Room 2	Room 3
Session II	Startathon	SII.1 Telemonitoring	SII.2 FELSI
Content	website	below	below
Chairs	El Kafil Abderrahman Moustakim Sapha	Karim Ouldim Maurice Mars	Abdellatif El Ouahabi Samir Kaddar
Room 2 14.00-16.00	Session II.1 : Devices, Telemonitoring, and e-Care (Chairs: K. OULDIM/ Mars Maurice)		
	22) A mobile tele-ECG strategy providing assistance to geriatric, outpatient and prison units in pelotas – Brazil Adolfo Sparenberg 23) Awareness of Nurses Towards Information Communication (TeleNursing) in Patient Care in Federal Teaching Hospital Ido-Ekiti, Ekiti State Nigeria Paul I. Sunmbola 24) eHealth, mobile devices and diabetes Anna E. Schmaus-Klughammer 25) Utilization of mobile short message service to enhance uptake of focused ante natal care among rural women Eliphas Gitonga, 26) Bring in the Drones: The potentials and the perils Pammla Petucka and Sandra Bassendowski 27) Vigisense solutions for real-time monitoring of care needs and care provision Lotfi Machraoui		
Room 3	SESSION II.2. FELSI IN TELEMEDICINE		
	28) Telemedicine: A Value Proposition business model Michele Griffith 29) Toward Measuring the Network Effect of the Regional Medical Information System Masatsugu Tsuji 30) Legal challenges of Cross Border Telemedicine between Morocco and the European Union Ikram Ganetri/Hassan Ghazal 31) Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study Hassane Alami 32) Knowledge, Skills and Practices of Information and Communication Technology among Public Health Midwives in Hambantota district, Sri Lanka J.L.P. Chaminda 33) The Facebook strategy for Global ehealth: evidence from social media pages of two televangelical churches targeting patients with chronic illnesses Charles Mpofu		

	34) A Framework for Successful mHealth Adoption in Developing Countries by Health Workers. A Systematic Review Michael Addotey-Delove		
16.00	Coffee Break		
Special session 16.30-19.00	**Telemedicine FOR AFRICA** **Chairs: Abderrahim Merzak/Frank Lievens**		
16.30	Telemedicine Societies in African Countries Andy Fischer / Yunkap Kwankam		
16:40	Octavio Déniz: Health-Tech Solutions for Africa		
17:00	National Digital strategies for Health in Africa Samia Chakri		
17:10	Telemedicine in Morocco Hassan Ghazal		
17 :20	La télémédecine dans le paysage politique de la santé marocain Samir Kaddar		
17:40	Telemedicine in Mali Ousmane Ly		
17:50	Telemedicine in South Africa Mars Maurice		
18 :00	The Need for a Telemedicine Strategy for Botswana Benson Ncube		
18:10	eHealth and Telemedicine in Poland & join projects with Africa Piotr Skarzynski		
18:20	eHealth National policies and strategies in developing Countries Najeeb Shorbaji		
18:20-19.00	General Discussion: Building an African Telemedicine Network		
20.00	social dinner		
Friday, December 8			
Education – Teleconsultation – National Programs			
Keynote session 4 : ChairS: Andre PetiteT/AdoLPHO			
09.00	**KS10 : Luis Falcon: GNU Health**		
09:30	**KS11: Fatima Rashid Al Ali: Telemedicine in UAE and The Experience of Abu Dhani Telemedicine Center**		
10:00	**KS12 : Peter Tonellato: Big data in Public Health**		
10:30	**KS13: Andre Petitet: The "JUMP" !!!**		
10.30	Coffee break		
Session VII: Parallel sessions 11: 12:30 (Room 1 Room 2 and Room 3)			
11-12.300			
Room	Room 1	Room 2	Room 3
Session III	S3,1. Education	S3.2. Teleconsultation	S3.3 National Programs
Chairs	Pirkko.Kouri Dan Gerendasy	Chakib Nejjari Andy Fisher	Yunkap Kwankam Najeeb Shorbaji
11. 12:30	SIII.1. Education in Telemedicine		
Room 1	35) Nursing education based on "hybrid" problem-based learning Paulo Marques, Nuno Correia 36) Dentistry in the Digital Age: Student Opinions and Perspectives on e-learning Rodrigo Marino 37) The opinion of Polish nurses about introduction electronical tools in the daily practice Dorota Kilańska 38) mLearning as medical eduction platform for Medical Residents in Sudan Amar Hamdi 39) Curriculum Development in eHealth Dan Gerendasy		
11. 12:30	SIII.2. Teleconsultation		
Room 2	40)Telecardiology : Contribution of robotic arm tele-operated during interventional procedure of ablation		

	Sahar Mouram 41) Telecardiology: Democratizing access to cardiac care Samir Kaddar 42) The Use of Telemedicine for Patients Needing Organ Transplantation: Barriers and Facilitators Mary Heekin 43) National Network of Teleaudology in Clinical Pracise – Telefitting in CI users Piotr Henryk Skarzynski 44) Hearing screening in school age children in different African countries Piotr Henryk Skarzynski 45) Technologic organizational support for health. Example of health's territory "Alpes du Sud" Alberto Lazzero
11. 12:30	Session III.3: National Programs In Telemedicine and eHealth (Chairs: Hossain MossaFA/ I. GANETRI)
Room 3	46) Portuguese National Centre of TeleHealth: Mapping stakeholders' telehealth knowledge, practice and expectations ***Micaela Seemann Monteiro*** 47) Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study ***Hassane Alami*** 48) Needs and requirement analysis of health professionals in rural areas – opportunities and barriers for the implementation of eHealth solutions in Figuig / Morocco ***Lucy Meyer*** 49) Canada's Tele-Pediatric Intensive Care Unit multi-Site Program: Effectiveness of tele-consultation on Children admitted to Remote Pediatric Inpatient Unit ***Mahmoud Nadar*** 50) Applications of Open Government Data in Perinatal Healthcare ***Chia-Hui Lee*** 51) An Evaluation of Framework Constructs Intended For Use In Botswana and other *Developing Countries for e-Health Readiness Assessment* ***Leonard Mauco***
12.30	Lunch
14:00	Closing Ceremony : General Discussion and Recommendations
15:00	END OF THE CONFERENCE and Social Program 2

ORAL PRESENTATIONS

Keynote Speeches

KS1. Telemedicine Where are we?

Frank Lievens
ISfTeGH, Geneva, Swizlerland

The presentation will focus on two fundamental issues: How far does Telemedicine/eHealth come from? How far can/should it still go? Key point is to optimalize Telemedicine/eHealth services rather than maximalize them. Besides highlighting the central position of patients/citizens, the authors are underlining the need for coordination between all elements and aspects of the system, as well as the predominant role of education.

KS2. The Evolution of Telemedicine Technology

Eric Bacon and Keri Dostie
AMD Global Telemedicine. United States
Kdostie@amdtelemedicine.com
http://www.amdtelemedicine.com

Done correctly, clinical telemedicine should not be an "island" of separate practice. The evolution of innovative technologies has changed the way we can practice telemedicine. When considering the right technologies for your telemedicine program, it is important to make sure your choice will easily integrate into your existing infrastructure and is scalable for potential future applications. This presentation will discuss how the right systems architecture and open systems approach can lead to a nationwide, telemedicine deployment at the fraction of the cost, effort and time compared to second generation (in-band) telemedicine. As telemedicine technologies have evolved, it is no longer good enough to be able to "capture and share" patient information. The true benefit of a telemedicine encounter is being able to accurately deliver real-time patient information between the exam site and remote provider. The use of older telemedicine technologies, such as in-band telemedicine, has its limitations for todays' clinical requirements and is more costly than new architecture technologies.
Attendees will learn:
- How others have integrated telemedicine into their workflows - telemedicine use cases.
- 5 major questions to ask and get answers to in order to architect and deploy a successful clinical telemedicine system.
- How to interweave telemedicine seamlessly with general healthcare practices.

KS3. Moroccan eGov strategy for Health

Mrs. Samia Chakri
Director, Department Digital Economy, Ministry of Industry, Trade, Investment and Digital Economy

La présentation se focalisera sur les points suivants : 1) L'eGouvernement au Maroc, 2) l'évolution des TIC au Maroc / historique de l'évolution de 1995 – 2009; 3) La stratégie Maroc numérique 2013 ; 4) la Gouvernance des services publics orientés usagers ; et 5) la confiance numérique. La Synthèse des réalisations e-Gov : -Bilan des réalisations e-Gov; -Extrait de quelques projets e-Gov; -Zoom sur quelques réalisations. -Les services mutualisables et métiers, -Indicateurs de l'e-Gouvernement et -Facteurs clés pour réussir un programme eGov.

KS4. National eHealth policies

Dr. Najeeb Al-Shorbaji
Vice-President for Knowledge, Research and Ethics e-Marefa (www.e-marefa.net), Amman, Jordan
Former Director of Department of Knowledge Management and Sharing, World Health Organization

The third global survey on eHealth conducted by the WHO Global Observatory for eHealth (GOe) has a special focus – the use of eHealth in support of universal health coverage. It was completed in August 2015. 125 countries completed the survey representing a 64% response rat. The scope of the survey was broad; survey questions covered diverse areas of eHealth, from electronic information systems to social media, to policy issues and legal frameworks. Indicators covering the following aspects were included:

1. eHealth foundations
2. Legal frameworks for eHealth
3. Telehealth
4. Electronic health records
5. Use of eLearning in health sciences
6. mHealth
7. Social media
8. Big data

As the focus of this conference is telehealth and telemedicine in Africa, this summary presents high level summary of the results from the WHO in response to the Telehealth questions in the survey

I would like to focus on Jordan as I am aware of some of the activities in the country. Jordan has been pioneering in using information and communication technology for health as the first telemedicine project in the Region was initiated at the King Hussein Medical City in 1976. There has been a number of commercial telemedicine services provided by private clinics for remote consultation and second opinion. King Hussein Cancer Centre provides telemedicine services through its collaboration with specialised cancer centres in the US. Two recent projects have been launched including: The Jordanian and Palestinian Telemedicine Network, and Jordan Telehealth Network.

KS5: eHealth as major component for national digital Strategy

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The e-health (Digital Health) a lever for the emergence of the digital kingdom For a better access to health care and social services. The ICT to the patient services Transforming health through ICT
Definition of the e-health (WHO and ITU): Each activity in which an electronic means is used to provide information, resourced and health services. It covers numerous domains, especially the electronic health records, telehealth, the mobile health, also the e-learning in the health domain, social media, analytics and the <Big Data>. *Regrouping all the electronic health services. The information and communication technology (ICT) is used to improve the health system processes, and to network the actor's concerned-patients, doctors, therapists, insured persons, insurance companies, laboratories, pharmacies, hospitals, and nursing.

The e-health (digital health) should be a major component for the national digital strategy, and of course it covers the health sector as a whole (public sector and private sector). E-health registers perfectly into the 6 main axes that Mr.Moulay Hafid El Alamy, the Minister of Industry, Commerce and the Digital Economy, presented to his Majesty The King Muhammed vi (see last slide of the presentation

INVESTMENT IN THE SERVICE OF CITIZENSHIP -THE DIGITAL MUST ACCELERATE THE EMERGENCE OF THE DIGITAL KINGDOM:
More investors in the sector: -E-health strategy would require investments of the order of 300 Million us$ to 500 Million us$ from the government to complete the digital transformation of the national health system. -Better access to social services, especially health: -E-health puts patients at the center of their preoccupations: o Facilitates access to care; o Promotes quality care; o Equitable access to health care for all; -More transparency: -e-health reinforces ethics in medical practice;-The health system will regain the citizens confidence;
-More opportunities: The e-health market is estimated to be 300 billions us$ by 2020; The e-health market in France is estimated to be 4 billions euros by 2020; The applications market mobile-health (m-health) is growing by 15%, reaching 31 billions us$ by 2020. -More efficiency: The e-health is considered by WHO as one of the most effective ways to reduce the costs of fraud, waste and medical errors; The production of national health indicators will be almost real-time, so decision-making will be faster.

KS6. Digitalization of the Human Capital management in health care

Anissa Berbich
AGIRH, SA

Human capital management in the health sector in an essential lever of performance: its digitalizationis therefore vital. It's necessary today to have and deploy all suitable tools tailored to match the Particular demands of this sector: Scheduling, on-call service management, skills tracking and monitoring, training, compensation.... are necessary to facilitatethe daily Tasks of collaborators, managers and Human Ressources managers. Our intervention will provide detailed guidelines on this subject and illustrated examples using our professional software program of human resources management AGIRH.

KS7. Telemedicine and intellectual property

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Appropriate protection of intangible assets has become mandatory in novel technology and service fields of activities. Innovation in Telemedicine and eHealth may combine 3 areas, i.e. software's, hard technology (such as devices and hardware's) and processes/methods. As opposed to common believes, patents are not always the most adequate types of protection or simply are not applicable. Therefore selection of the most appropriate tool to protect the intellectual property (IP) is key. During this conference, the different types of IP protection will be briefly introduced including patents, utility models, trade-marks, copyrights and trade secrete. The key criteria (including type of innovation, targeted market, legal differences between countries, competition status etc.) for selection of one or several of these IP tools will be explained. Participants will learn how combination of several layers of protections is the most powerful strategy.

KS8:GNU Health

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GNU Health is a Free/Libre project for health practitioners, health institutions and governments. It provides the functionality of Electronic Medical Record (EMR), Hospital Management (HMIS) and Health Information System (HIS). Its modular design allows to be deployed in many different scenarios: from small private offices, to large, national public health systems. GNU Health counts with a growing, committed and friendly international community, that brings the best from the social, biological, medical and computer science fields.

KS9. Telemedicine in UAE and The Experience of Abu Dhabi Telemedicine Center

Fatima Rashid Al Ali

The UAE is a young country that has undergone a truly inspirational transformation since its establishment. This evolution has occurred, in large part, thanks to the vision of the leadership. Abu Dhabi has played a pivotal role in the development of the UAE's healthcare sector, with a goal of setting up a strong and future-focused health ecosystem – one that has technology at its core.

Thanks to the advent of new technologies and, indeed, Mubadala's growing network of world-class healthcare facilities, telemedicine has started to play an increasingly significant role in the UAE's healthcare system. While in the past, people would traditionally head abroad to seek quality healthcare, world-class solutions are in fact not only available on our doorstep, but thanks to telemedicine, direct access to a qualified doctor is now being made available without even having to visit a clinic or hospital. With proven, innovative healthcare services delivered by phone, patients are now using the service to obtain the highest standard of medical consultations remotely, for all of their daily healthcare needs.

As with the implementation of any new technology in a rapidly-changing industry, telemedicine has its challenges, but its benefits far outweigh them. It has led to more efficient and cost-efficient daily healthcare management, and round-the-clock help available to those who need it. It takes the pressure off the emergency room, and improves access to quality healthcare, particularly in more remote areas.

The challenges that we have faced with the advent of telemedicine here in the UAE are not exclusively faced by our region – these are issues that are being encountered everywhere across the world. Telemedicine is often misunderstood, and there are some misconceptions about how it can be implemented, as well as legal implications. However, telemedicine could also have a positive impact on the trust placed in the regional healthcare industry – if the benefits of a service that doesn't involve face-to-face contact can be trusted, then this implies trust in the system itself, as well as the capabilities of the experts and facilities involved within it. In Abu Dhabi, we are confident that as we continue to integrate telehealth services more and more fully into the Emirate's healthcare industry and its offerings, demand will rise – particularly as we move from telephone to video consultations in the future. From our experience to date, we believe the health-focused and financial impact telemedicine could have in the region and beyond, is considerable.

Our aim is to see telemedicine integrated into the existing system as a complement to

hospitals and pre-existing healthcare solutions. It's an integral part of a progressive and cultural shift in our mindset, and our approach to what healthcare has the potential to be in the modern day. It is, quite simply, the way of the future – and what hope lies within it.

KS10. Big data in Public Health

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Fundamental to Precision Medicine is the detailed and fine-grained collection of individual-by-individual digitized biomedical, clinical, environmental and (more recently) social data. Once collected, curated and stored, this massive heterogeneous collection of individualized data must be actively managed; easily available to investigators for complex analysis; and used in large, shared environments for population-wide studies targeting complex disease and long-term disease prevention studies. For thirty years, the development of web-based systems have partially but not fully address the complexity of the data problems associated with these collections. More recently, several promising approaches and technologies have created break-through opportunities to solve the technical, privacy, and computational problems associate with big data science supporting translational projects towards precision medicine. We present two examples of such systems, approaches and technologies and discuss their use in complex disease translational science projects. These approaches, technologies and their application demonstrate breakthrough opportunities for a return to "small" lab science and create a disruption to the ever growing "Big" science paradigm that have dominated scientific activity for the past few decades. With these easily manages resources, individual PI and investigators can once again make significant contributions without belonging to the 100+ person project consortium

KS11. The "JUMP" !!!

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In the daily life medical practice, one of the main tasks is the face-to-face consultation. This is the time where the physician receives a sick individual. This time is very well scheduled. From welcome to prescription, there are no less than 10 phases. Telemedicine raises since the 80s. The first description and definition informs that this new means is the consequence of technical progresses globally called NTIC. The major factors at the origin of telemedicine were new telecommunication networks, computers' miniaturization and power and, first of all, human exploration space flights. Year after year, it is becoming more and more easy to use the new tools generated by the telemedicine concept. Many experiences were performed, mainly in the hospitals and clinics networks. Recently, a new original law for the use of telemedicine was adopted in France. In this law, it was clearly mentioned that telemedicine is officially a remote medical practice. Therefore, it was time to propose a new approach for the consultation: the teleconsultation. This is a real "jump" from the traditional face-to-face consultation. It is needed to have a close collaboration between informatics, telecommunications and medical practice. Today, the "jump" is in the practical phase on the field. From a telemedicine's platform, a patient can be examined by a physician with all the necessary resourcefulness even if the distance between both is more than 800 km. This communication will present the results of the "jump" on a 9 months period.

Short Oral Communications

1. BLOCKCHAIN TECHNOLOGY IN HEALTHCARE-Step forward into healthcare interoperability with IoT distributed data

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From the very beginning of information technology usage in healthcare, the data producing was always in the matter. Either, the simple patient personal records or various medical treatment descriptions, it always needs to be a countable amount of data in digital form.
An overall technological advance has made medical devices become smarter and, therefore, the ability to produce a higher amount of data. In addition, computer networking and the Internet have enabled data exchange both in the local (hospital) and in the Geo-global environment. Besides medical devices, most of the power supplied devices around us became also smarter. Vehicles, trains, planes, lights, watches, parking garages… get a common denominator in the world of smart devices and it is called Internet of Things (IoT) - with the basic idea of connecting all devices to each other. The IoT can be understood as the natural evolution of the web as it merges information technology and many other operational technologies. It links more than ordinary life devices – it connects all that devices containing such a sensors collection. By connecting and networking a common thread is IoT based machinery that uses data streams as its fuel.
The digital revolution led by IoT (i4.0) has not bypassed the sphere of the healthcare.
Not taking into account all the technological and technical obstacles such as lack of interoperability and different standards in terms of integration, we come back to the starting point of view of that unique element which is concomitantly building block or the end product and that's the - data. In our case, these are the data of the patient. Whether this is just a basis for the identification of a patient in the system (EHR) or used as an expanded set of data in the analysis and prediction of disease and diagnosis, the data is potential, high risk factor. Seen from the patient as a consumer, if its data is vulnerable.
In the process of data collection from points of origin to its final destination, securing the data is required under the HIPAA compliance. But in practice, it turned out that due to deficiencies in the security standards should lead to greater involvement of the IT sector in the field of data protection and increased interoperability.
A new technology such as Blockchain is very promising in terms of increasing interoperability, security transfer and exchange of information. As the information is distributed over the network(s), Blockchain especially has become as a solution to establish the trust of all the factors in the world of digital healthcare. Also, all challenges addressing the security of protected health information (PHI) and HIPAA compliance has an opportunity as a solver tech by using Blockchain encrypted data and its validated replication over the network.
From another standpoint, the healthcare data are very complex. They are built of various data formats, images and videos, sometimes non-structured up to structured data. All that is the representation of a single health record of the patient. Such patient records, time-stamped and signed by using a private key under the Blockchain can be distributed without losing data integrity and make the stairway to deep learning, a new technology based approach in healthcare data analysis and prediction. Putting them together, the principle of secure, valid and distributed health information is likely to be closer to goal of the healthcare interoperability and precision medicine with promise to unlock access to all population health data.
In addition, the caregivers, community of people, doctors, patients, insurances and all other health information consumers, by being a part of Blockchain reduces a fraud in healthcare payments.

2. Integrating heterogeneous health records

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Exchanging and integrating medical information in the healthcare domain is a challenge. Indeed, the diversity of databases and the different representations of information sources make this exchange a very difficult task. Divers standards, (e.g. HL7: Health Level Seven; DICOM: Digital Imaging and Communication in Medicine), are created to enable the exchange and make health information systems interoperable. However, applying standardization requires changing the structure of existing healthcare systems. Our main purpose is to create a document for exchanging health information between heterogeneous systems without applying changes on their internal structure. The document uses the XML language to allow a structured and flexible exchange of healthcare data.

3. Towards Interoperable Personal Health Records

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A personal health record (PHR) is a record of a consumer that includes data gathered from different sources such as from health care providers, pharmacies, insures, the consumer, and third parties. It includes information about medications, allergies, vaccinations, illnesses, laboratory and other test results, and surgeries and other procedures. An ideal PHR would provide a complete and accurate summary of the health and medical history of a consumer.
A problem of current PHRs is that they assume all its content to be restricted on health-oriented personal data. However, there are a lot of related data, which use together with PHR data would produce outcomes that could not be achieved by functioning independently. Examples of such PHR-related personal data sources include gyms, smart homes and personal note books. Using these data sources together with PHRs' data we can achieve new outcomes: For example, a person may be interested to know his or her blood pressures when his or her weight had maximal and minimum values.
There are also a lot of public data sources, which use together with personal data would produce outcomes that would not be achieved by using only personal data. For example, personal data may indicate the vaccinations of a person, while public data source can augment this information by more informal descriptions of the vaccinations. Further, as public data sources are increasingly linked among themselves according to the notion of the Linked Data, the data sources that can be reached from PHRs is increasing all the time. For example, the open data sources dealing with medicines or clinical guidelines are particularly useful when used with PHR-data.
Issues with combining heterogeneous data sources, under a single query interface have existed from the early 1980s, when computer scientists began designing systems for interoperability of heterogeneous databases. Nowadays, at the advent of the Semantic Web the issues with combining data sources is still equally relevant as the Semantic Web paradigm involves a broad set of modern technologies such as Resource Description Framework (RDF), Web Ontology Language (OWL) and SPARQL that tackle these issues.
A relevant issue is how these technologies can be used in combining relevant external data sources with PHRs. However, a problem in combining external data sources with PHRs is data heterogeneity: there is a variety data models on which these data sources can be based on. For example, a data source may be a relational database or an XML-file. Further, the schemas of PHRs' XML-files may be ad hoc, (e.g., the CCR standard of the American Society

for Testing and Materials (ASTM)) or based on the Reference Information Model (RIM) (e.g., the CCD standard of the HL7).
Our solution for this heterogeneity problem is the use of smart data. Smart data refers to data that is application- independent, and part of a larger information ecosystem. Furthermore, RDF is the key for representing smart data. In RDF, we can express facts with tree-part statements known as triples. The subject identifies the thing being described, predicate is a property name, and object is property value. So, each triple is like a little sentence that states a fact.
However, RDF in itself does not bring smartness. It depends on the expressiozghiin power of the used vocabulary. By a vocabulary we refer to a set of ontologies, which formally specifies the used terms and their semantics. The key point here is that shared ontologies provide the ability of two or more systems to exchange information and to use the information that has been exchanged.

4. eHealth Interoperability Challenges and opportunities for Botswana integrated patient management system ((IPMS)

Kagiso Ndlovu

5. Information system for a National newborn screening program

Kamal Marzouki/ Souad Chaqsar

eHealth is the use of information and communication technologies (ICT) for health. In its broadestsense, eHealth is about improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems. The successful implementation of eHealth requires strategies that are aligned with the national health priorities. In low and middle income countries (LMICs), maternal, newborn and child health programs have incorporated eHealth strategies to offer services such as pregnancy and birth registries, immunization and nutrition tracking. One of the fields where the necessity and the opportunity of setting up a national eHealth strategy are newborn screening (NBS) programs. NBS for severe metabolic and hematologic disorders, that can cause death or may hinder an infant's normal physical or mental development, are well established in high-income countries. These disorders can be addressed by effective therapies at the early stages. In LMICs, however, newborn health care is primarily focused on preventing malnutrition and infectious diseases, because these remain the main causes of child mortality in these countries, and detection of genetic diseases is usually not a priority in their public health agendas. Establishing a sustainable NBS program requires building an information system or eHealth infrastructure that allows rapid and effective bi-directional communication between the NBS actors. These systems track clients (babies) from their first contact with the Screening Center through their last follow-up test, producing worksheets, result reports, letters, and summaries for archival storage. Using internationally-accepted health information exchange standards allows data exchange and collaboration with

international NBS partners. Recently, a pilot NBS program is being established in Morocco. Screening is done in the first few days of life, and the goal is early identification of healthy- appearing newborns before they suffer significant morbidity or mortality. NBS programs are a collaborative effort between public health departments, hospitals, laboratories, and pediatric care providers. Establishing a sustainable NBS program requires building an information system that allows rapid and effective communication between the NBS actors. We are developing a NBS Information System (NBSIS) that will be capable of handling the information processing needs of the prospective Moroccan NBS program. We first analyzed the information workflow of the proposed national NBS program in order to determine its information processing needs, which include: 1) collection of newborn and maternal data; 2) reporting NBS results for both in-range and out-of-range screens (i.e., cases) in real time; 3) exchanging information between various independent, heterogeneous systems; and 4) enabling population-based surveillance. Second, we evaluated the capabilities and limitations of existing information systems. Third, we designed a web application that can be used to collect newborn and maternal clinical data, store laboratory screening results,

collect data over time for cases identified by NBS, and allow secure data access to all of the relevant NBS actors. We are evaluating the HL7 health information exchange standard as well as the NBS coding and terminology developed by the US National Library of Medicine for potential adoption and implementation. The NBSIS will be used to track babies from their first contact with the Screening Centers through their last follow-up test and will be capable of producing worksheets and creating result reports for archival storage. Using internationally-accepted health information exchange standards will also allow data exchange and collaboration with international NBS partners.

6. Moroccan Colon Cancer Database

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Colorectal cancer (CRC) is one of the most common cancers in Morocco. We build a Moroccan colorectal cancer database (MCCD) for the purpose to capture all the data that may play a major role in cancer research and for a better managing of healthcare. This MCCD includes detailed information about family history, risk factors, eating habits and other information related to diagnoses and clinical notes. Patients with colorectal cancer were recorded between 2009 and 2013 from the National Institute of Oncology in Rabat and the

Hospital University Center Hassan II in Fez. Data were collected from 525 patients; aged between 16–90 years, with 26.3% of CRC patients were ranging from 50 to 59 years. We observed that 46.1% of cancers were localized in the rectum, 31.1% of complaining symptoms were rectal bleeding and the most used treatment was surgery (62.2%). It is expected that this database will contribute to generating great information about colorectal cancer, provide important information for epidemiological studies and support colorectal cancer research in Morocco. MCCD data will be used to explore trends in cancer care, and to serve as the basis for quality improvement activities.

7. A new approach for diagnosis of diabetic retinopathy

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In the field of ophthalmic pathologies, diabetic retinopathy has one of the most common complications of diabetes disease. Diabetic retinopathy is damage to the blood vessels of the retina in people with diabetes. This condition develops silently and in a sneaky way for many years. Only a regular screening test would diagnose such interference in its infancy. Note that diabetic retinopathy is a leading cause of blindness in people with diabetes. This syndrome affects up to 80 percent of all patients with diabetes for 10 years or more. Despite these intimidating statistics, research indicates that at least ninety percent of these cases could have been reduced if they had received adequate treatment on time. This shows the great importance that has the early diagnosis of such condition.
The usual and classical technique for screening for diabetic retinopathy is based on the examination of the funds of the eye, performed by an ophthalmologist after pupil dilation. This type of examination is easily understood that varies according to the judgment of the treating doctor, and that a large part of subjectivity persists, especially in cases of early attacks.
In recent decades, new methods of screening for diabetic retinopathy have been tried. The method of making photographs of the funds without pupil dilation, using a digital camera is the most relevant. It is a non-invasive method and can be performed by a technician within a short time. It allows us to take digital photographs, which are transmitted to a central database for testing. To process these data (retinal images), several methods have been tried and reported in the literature. But it seems that the methods using fractal analysis are the most consistent and the most likely to give very accurate results. The fractal dimension is the main tool of fractal analysis. This is one of the parameters used to characterize the complexity of blood networks. Based on the estimation of the fractal dimension, using different algorithms, several studies on the mechanism of formation of the vascular network of the retina have provided impressive results and therefore have given rise to new and very important interpretations.
We discuss in this work the contribution of fractals in the diagnosis of the diabetic retinopathy, by a non-invasive method. We will take two samples of each ten retinal images, one is normal and the other is pathological. We will calculate the fractal dimensions for each sample. The comparison of the values obtained for the two samples have led to a significant result, allowing distinguish between normal retinas and pathological retinas.

8. Using the Haddon Matrix to Understand the Role of Disaster e-Health

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Introduction: Disaster e-health (DEH), the application of e-health to disasters, is a new field.

While aspects of e-health have already been applied to disasters, primarily during the response period, informed and structured understanding of exactly where and how e-health might support disaster planning, response, and recovery is unclear. This study examined the application of Haddon's Matrix (an established and proven tool that helps identify factors (or issues) that contribute before, during, and after an injury-causing event), as a means to understand where and how the matrix might inform use of e-health during all phases of the disaster management cycle.

Methods: A qualitative focussed literature review and conceptual framework development process was adopted, with the Haddon Matrix as the base model. Key issues were extracted from a literature review of the application of Haddon's Matrix to disaster (1 January 1990 and 30 June 2017). Key search terms were: Haddon Matrix AND (Disaster e-health OR e-health OR Telemedicine OR disaster planning OR disaster response OR disaster recovery OR disaster medicine OR disaster management). A unified electronic database search identified 3,799 resources. After removal of duplicates and application of inclusion criteria (the resource addressed use or redesign of the Haddon Matrix in relation to disaster preparedness, response, or recovery), twenty-four (24) examples were identified.

Results: Haddon's Matrix has been applied to or proposed for planning or analysis of a variety of disasters or disaster settings. These included: mass gatherings such as music festivals or religious festivals; industrial accidents; ferry boat accidents; terrorist attacks; meteorological disasters; and other natural disasters. In addition, it has been applied to specific areas of disaster medicine including pandemics, burns, and psychiatry, or a combination of areas. It has also been applied to risk reduction, fire risk assessment, hospital staffing during a disaster, and even been used in research and educational aspects of disasters.
By drawing on issues from these literature sources, and systematically and iteratively fitting these into a revised Haddon Matrix, a new conceptual framework was progressively devised by which to question, analyse, and explain the potential utility and value of e-health to disasters. All primary areas of e-health (telehealth, health informatics, and technology-enabled and enhanced training (TEET, or e-learning) have potential application at one or more phases, and are able to address issues within one or more factors, of a disaster. However, some areas may have little opportunity for e-health application (identifying 'disgruntled workers' or 'negligent employees'), or an application area may extend beyond the 'health' mandate (e.g., geolocation of stakeholders). Final selection and application of e-health solutions will depend on awareness and training of personnel, ease of use and maturity of proposed e-health solutions, and socio-economic and cultural acceptance.

Conclusion: In order to facilitate a useful dialogue and to inform disaster professionals about the appropriate application of e-health, it is necessary to have some prior and informed understanding of just where and how e-health might assist at any and all stages of the disaster management cycle. This study has helped grow this understanding. Application of the Haddon Matrix will help identify disaster issues that may be amenable to one or more e-health solutions – or that may not be amenable at all. Further input, refinement, and validation of the model is needed, as is education about uses and limitations of e-health for disaster planning, response, and recovery.

9. Selfie Telemedicine: A Review of the Future?

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The Oxford English Dictionary defines “selfie” as, “a photograph that one has taken of oneself, typically one taken with a smartphone or webcam and shared via social media”. Selfies have become an integral part of everyday life. Just as doctors have found innovative ways of using their mobile phone cameras with instant messaging, the Web, or email, to share patient information with colleagues for telemedicine consultations, patients are doing the same thing. Recent reviews of clinical use of WhatsApp instant messaging, mDermatology, and direct to consumer telemedicine, have reported cases of patients taking selfies and sending them to doctors for advice and treatment. The aim of this study was to review the use of selfies in medicine.

Methods: PubMed, Scopus, Science Direct, EBSCOhost and Google Scholar were searched, supplemented by hand searches of references and citations of papers found. The search strategy was “selfie” linked with the Boolean operator AND to medicine, telemedicine, telehealth, eHealth, e-Health, mHealth, m-Health. For Google Scholar, the search term “direct to consumer telemedicine” linked to selfie was also used. In Google scholar the first two hundred hits for each search combination were reviewed. For papers identified in Google scholar, other papers citing the work were also reviewed as were related papers identified in PubMed searches. Inclusion criteria were that the paper described the use or potential use of selfies in clinical practice. Papers describing injuries caused when taking selfies, selfie addiction and the effect of selfies on mental health and self-image were excluded.

Results: 3,611 references to selfies were found, of which 771 met the inclusion criteria and after removal of duplicates 51 papers were reviewed. The majority of papers were dermatology related and included dermatological conditions such as melanoma and psoriasis, and dealt with dermoscopy, skin self-evaluation, lesion monitoring and biopsy site identification. Other uses included postoperative wound monitoring following day surgery, burn wound follow-up, orthopaedic pin tract management, monitoring ptosis in myasthenia gravis, oral pathology and hygiene, and video evidence of medication adherence. Several papers reported techniques for taking selfies including oral and ophthalmic pictures and provided guidelines for photography. Image quality was generally regarded as satisfactory and reported concordance was acceptable.

Selfies for clinical use can be broadly classified into unsolicited patient initiated photographs or clinician directed photographs. Unsolicited selfies include patients seeking advice from their personal doctors, doctors in their healthcare provider or insurance group and direct to consumer telemedicine Web sites. Some patients submit selfies to online social media support groups and receive less formal advice. Physician directed selfies usually relate to monitoring and follow-up. The selfies may also serve as a step in a triage process with nurses or other health professionals assessing the images and referring to doctors when necessary. Some patients are concerned about the accuracy of diagnoses made from selfies. The usual issues of data security, storage, confidentiality, HIPAA compliance, licensure, remuneration, authentication and legal and ethical issues are raised with little mention of record keeping. Unsolicited patient selfies present a novel situation – patient consent is not required and the patient, knowingly or unknowingly, takes ownership and the responsibility of maintaining the security, storage, confidentiality and transmission of their data on and from their phone. The doctor then is only responsible for securing what has been received and used in clinical practice.

Conclusions: The use of selfies is growing and is currently akin to the introduction of the telephone, which allowed patients to interact with their doctors at a distance. The benefits and disadvantages of selfie telemedicine need further investigation so that guidelines can be developed for both patients and practitioners.

10. The Development of an Evidence-Based Teledermatology Scale-Up Framework and Roadmap

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Introduction: The objectives of South Africa's (SA) ehealth strategy recognise the value proposition that telemedicine holds for rural and urban referrals, but a lack of accepted and formalized scale-up implementation and financial planning has impeded unlocking these benefits. Because HIV/AIDS remains a major cause of morbidity and mortality in South Africa, and because skin pathology is often the first sign of an HIV/AIDS infection, swift, organised, and efficacious dermatology referral is essential. While there are examples of teledermatology, both synchronous and asynchronous, in South Africa's public health system these remain localised and have not been widely implemented or scaled-up and have not realised the intended telemedicine objectives. This has placed the public health system at a disadvantage in making the dermatology referral pathway neither effective nor efficient. This paper presents the development of an evidenced-based TeleDermatology Scale-up Framework (TDSF) and supporting roadmap to assist with ensuring sustainable scale-up.
Methods: Literature reviews were undertaken of teledermatology in SA, existing and related frameworks, and scale-up and implementation approaches for ehealth These were supplemented by semi-structured interviews and observations of key stakeholders. A qualitative method with a design science research process model was used which consisted of five phases: The awareness phase confirmed the need for an evidence-based TDSF and supporting roadmap; the suggestion phase delivered a proposal on how to develop a TDSF; the development phase identified recommended design requirements and used these to identify and critique existing teledermatology or related scale-up frameworks; the evaluation phase assessed outputs of the development phase against the design requirements and validated the TDSF and roadmap with key teledermatology management stakeholders using a questionnaire with a 5 point Likert scale, and the conclusion phase used the validation results to finalise and communicate the TDSF and roadmap. The study was undertaken in the province of KwaZulu-Natal, where synchronous teledermatology has been ongoing between three rural hospitals and the local Medical School for more than 10 years and an informal instant messaging store and forward service has been running for more than 3 years.
Results: The literature reviews found no teledermatology scale-up framework, but did identify 'related frameworks' for scale-up of ehealth and general health interventions. Most of the related frameworks were too focussed on specific elements of scale-up, or were discussions. The study identified five TDSF components comprised of ten ehealth building blocks, six scale-up drivers, four scale-up continuum stages, three scale-up phases, plus scale-up activities and associated steps. In addition thirteen core concepts of equal importance were identified; evidence-based scale-up need, stakeholder management, legal and regulatory, ehealth governance, scale-up strategy, detailed scale-up planning, mobilisation of scale-up resources, scale-up readiness, scale-up implementation, scale-up benefits realisation management, scale-up risk management, scale-up finalisation, and operational and scale-up sustainability plan. The core and sub-concepts were further characterised and described to enable design of the final evidence-based TDSF. A roadmap was prepared as a guide for the implementer with step-by-step instructions for application of the TDSF. The TDSF and supporting roadmap received an average Likert-scale rating of "4=Agree" when teledermatology management stakeholders were asked if they found it useful as a guide to assist the South African public health system with teledermatology scale-up.
Discussion: A TDSF and supporting roadmap can contribute to scaling-up and achieving the benefits of teledermatology. Implementation of the proposed evidenced-based TDSF and supporting roadmap is recommended.
Conclusion: This study developed a TDSF and supporting roadmap that are evidence-based. The proposed approach and resultant TDSF and roadmap could be adapted to assist with ensuring scale-up and sustainability for other ehealth and or telemedicine practices in other locations.

Security Concerns in the Use of Instant Messaging in Healthcare

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There is a growing body of evidence highlighting the benefits of mobile teledermatology in terms of cost effectiveness, efficiency and patient satisfaction. These benefits of quick, cheap and easy use have been further enhanced through the development of instant messaging (IM) applications (apps) such as WhatsApp, Viber, WeChat, Face Book Messenger etc., which enable the transmission of images and text messages. Not surprisingly doctors, often younger doctors, have exploited the power and functionality of these new technologies making existing processes and ways of doing things quicker, cheaper and easier to use. A recent survey found that 80% of physicians use smartphones and medical apps. Whilst usability (better, cheaper, faster) has been the key to the success and popularity of IM, there are growing concerns regarding the security and safety of communication transmissions and data stored on mobile phones. The aim of this study was to review the literature on the security concerns related to IM and the levels of security of a range of IM platforms.
Method: The electronic databases PubMed, Scopus, and Science Direct were searched using the following instant messaging apps as a keyword: WhatsApp, Telegram, WeChat, Snapchat, Viber, Face Book Messenger, LINE, MixIt, Instagram and Skype. A sub-set of these references was then identified using the inclusion criterion security.
Results: The search was conducted in March 2017, and identified 175 references. After removal of duplicates 160 publications remained. An additional 12 references were found from hand searching. WhatsApp was the most reported IM application used with 89 references followed by Telegram (20), WeChat (17), Snapchat (12), Viber (5), Face Book Messenger (2), LINE (3), MixIt (2), Instagram (2), and Skype (8). After title selection and abstract review, 91 papers met the inclusion criteria and were reviewed. When security concerns were used as the inclusion criteria, 24 references were found from WhatsApp and only one reference from LINE.
Issues relating to transmission networks, data storage, certification, and phone management and use were identified. Data are at risk at several levels, including during its transmission, storage on servers en route, and on the sender's and receiver's phones.
The levels of platform security and encryption levels of IM apps were reviewed by an independent security organization, which found wide variation across different platforms. From their scorecard all the IM platforms failed at least one of the 7 point criteria which comprised: transit encryption, third party access, independent correspondent verification, security of past communications, independent review, documentation of the crypto design, and independent security audit. WhatsApp performed the best failing only the independent review criteria. FacebookChat, GoogleChat, Kik Messenger, Snapchat, and Viber all failed on criteria 2-6, Mixit failed on all criteria, Skype and Yahoo Messenger failed criteria 2-7, and Telegram failed criteria 2-4. WeChat, Instagram and LINE were not evaluated.
Conclusions: There are rising concerns regarding the security and safety of communications and data stored on mobile phones. However, the security concerns are not only with the transmission and storage of the data but also with the use and management of the smartphone. The risk is, of course, around data security and therefore patient confidentiality. Guidelines on the appropriate use of IM such as WhatsApp are needed to assist users in adequately tackling the associated medicolegal and ethical concerns.

11. TELEMEDICINE : Let us have to worry about the consequences of cyber attacks ?

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For the years 1980-1990, the development of telemedicine was due to the extraordinary

progress of the electronics, the computing and the means of communication. This progress is collectively included under the word NTIC (New Technologies of information and Communication). Over time, telemedicine benefits from using smaller and smaller computers yet with higher capacity, more and more complex but also more and more targeted and powerful algorithms, transmission systems such as GSM, GPRS, EDGE, 3G, 4G, the optical fiber and the satellite. Today, it is easy by teleconsultation with video conference to send and use remotely on real time, a complete file of a patient, to direct a diagnosis and to prescribe an adapted treatment. It is thanks to internet and to the "cloud" that it is possible. Further, by the fact that they use and pass personal medical data, what about their safety and confidentiality, two major conditions for the protection of the private life and the medical practice? Now since a few years, and this is true more and more, the media echoed cyber-attacks whose most significant were the intrusion in the computer system of the Pentagon (USA), in the individual system of the customers of ORANGE (France) and to the intimacy of mobile phones as by the NSA and personalities' mobile phones such as the German chancellor Angela Merkel. There are other numerous examples which will be detailed during the communication. Conclusions: in such circumstances, it is worth to pay more attention to the encryptions, basal security measures, complex procedures used by the secure messaging and by the companies which provide host systems to store personal medical data.

12. Data security and encryption of patient data transferred using the example of mobile devices and diabetes

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With increasing mobility and Internet usage, the demand for digital services increases and has reached critical and high assurance domains like e-Government, e-Health and e-Business. Those domains have high security and privacy requirements and hence will be harnessed with various novel mechanisms for secure access. Approaches for handling the resulting variety of authentication and authorisation mechanisms include the use of digital identity and access management systems (IAM). Like other technologies IAMs follow the trend of using cloud services. This allows abstracting over used resources and enables ubiquitous access to identity data which is stored and processed in the cloud, but also results in an additional degree of complexity for securely operating IAMs. The goal of CREDENTIAL, a Horizon2020 project, is to develop, test and showcase innovative cloud based services for storing, managing, and sharing digital identity information and other critical personal data. The security of these services relies on the combination of strong hardware-based multi-factor authentication with end-to-end encryption representing a significant advantage over current password-based authentication schemes. The use of sophisticated proxy cryptography schemes will enable a secure and privacy preserving information sharing network for cloud-based identity information in which even the identity provider cannot access the data in plain-text and hence protect access to identity data.

13. PRIMARY IMMUNODEFICIENCIES ON SMARTPHONE: A NEW APP FOR PID CLASSIFICATION

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Primary immunodeficiencies comprise at least 300 genetically-defined single-gene inborn errors of immunity. The International Union of Immunological Societies (IUIS) Expert Committee on Primary Immunodeficiency meets every other year to update the classification of human primary immunodeficiencies (PIDs). In recent years, another form of classification has been published by the IUIS PID expert committee: a more user-friendly classification based on phenotype and laboratory results.
This last classification has been welcomed by the PID community and is now updated at the same rate as the original classification. Here, we present you a new application available Android and iOS displaying the 2015 phenotypic classification published by Bousfiha et al (J Clin Imm, 2015).
This application presents the 9 figures on your smartphone, so that you can get your PID diagnosis literally at the bedside. You can also access to the table including your suspected diagnosis by using the function "Search by disease name", or input the clinical features to select matching diseases in the function "Search by manifestation". There is also a laboratory guideline, linked to the tables in "How to explore PID". In addition, the application contains the age-related reference values for the analyses used in the tree-based decision-making process included in the figures (CBC, Ig levels and lymphocyte numeration), and a dictionary French-English-Arabic for the terms used in this field. Moreover, three case studies are proposed to train yourself (part of the workshops proposed by the African Sosciety of ImmunoDeficiency).
This application makes the IUIS classification available for anyone, anywhere and at anytime.

14BIS. COSMETIC PRODUCTS: ANALYSIS OF TRENDS THROUGH KNOWLEDGE. ENGINEERING TECHNIQUES

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By using knowledge engineering tools have been identified the latest trends in research and development of new cosmetic products. To process more than 7000 scientific papers related to cosmetic research published in the period 2001-2012, has been used the knowledge system Techné CoWord. The documental body has been divided into four equal periods of three years to identify the most significant research themes and technological developments. It has been used co-word analysis with algorithm of simple centres. These interest centres have been represented on a strategic diagram that identifies their strategic position in the network technoscientific of cosmetics. An analysis of the temporal evolution along all periods has defined the most important trends in research and development of cosmetics. With positive knowledge acquired has been possible to make a prospective analysis of the new challenges that the industry will face in the coming years.

14. Utilization of mobile short message service to enhance uptake of focused ante natal care among rural women

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Utilization of mobile short message service to enhance uptake of focused ante natal care among rural women
Background: The Sustainable Development Goals targets a global maternal mortality ratio not greater than 70 maternal deaths per 100 000 live births by 2030. In Kenya the maternal mortality ratio is high at 362 maternal deaths per 100,000 live births. Focused ante natal care approach recommends four targeted visits in which individualized care. Focused ante natal care increases the level of skilled birth attendance which reduces maternal mortality and morbidity. Mobile health has been known to improve outcomes in several health conditions.

The aim of this study is to assess the influence of mobile phone short message service on uptake of focused ante natal care and its outcomes among women in Tharaka Nithi County, Kenya. Methodology: A single blind randomized controlled trial was carried in selected rural health facilities. The sample size was 118 respondents for each arm. Random allocation through a computer application to interventional or control arm was done. The interventional group was sent one text message per month from booking to delivery while the control group was not. The short message services had content reminding the women of their next ante natal clinic appointment. Structured questionnaires and key informant interview guide were used in data collection. Chi square and multiple logistic regression were used to draw inferences. Results: The utilization of focused ante natal care for the respondents was 57%. The uptake in the intervention group was 75% versus 10% in the control group. The chances of utilization of focused ante natal care was 27 times more among the intervention group compared with the control group (odd ratio = 27, P<0.001). The intervention also influenced the outcomes of focused ante natal care; namely place of delivery with 98% of the women in intervention group delivering in health facilities versus 78% of the control group (odds ratio 16, P<0.001). Completion of ante natal profile in intervention group was 81% versus 53% in the control group (odds ratio 3.9 p<0.001). The use of health promotion practices was 68% versus 27% in the control group (odds ratio 5.6, p<0.001). Conclusion: mhealth can improve the uptake of focused ante natal care among rural women through timely reminders.

15. Mobile application for drug addiction follow-up and treatment

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Drug use has harmful consequences to mental and physical individuals' health. Over 400 000 persons die every year and, worldwide, the health status of 29.5 million people deteriorates due to disorders related to drug use. Also, its use has a negative impact on the social relationship quality. Recently, an important evolution of mobile applications has been observed. Medical mobile apps can be employed to reduce drug use and motivate patients' adherence to disease prevention and treatment, medication management and healthy lifestyle change, as well as to improve communication between patients and healthcare professionals. However, most of the applications are not scientifically evaluated and their reliability is not proven. This study focused on apps dedicated to Psychoactive Substance Abuse and Addiction (PSAA) and available on virtual stores. We performed a search of PSAA mobile apps on Google play and Apple stores using as keywords: "Alcohol", "Cocaine", "Cannabis", and "tobacco". We analyzed and organized apps' data and information in a database. Functionalities and classifications of identified apps were explored according to the users' profiles. The main services provided to the users on these identified apps are: "Informational tool", "Tracking tool", "Cognitive Behavioral Therapy (CBT)", "Counter abstinence" and "Text chat". On Google play and Apple stores, there is no requirement for quality labels to submit a medical app under medical and health categories, and given this fact, users' safety is threatened without healthcare professionals' endorsement. Close cooperation between apps designers and healthcare professionals is essential to enjoy the full benefits of mHealth for treatment of PSAA. We are evaluating the usefulness, efficiency, and suitability of most relevant applications in the Moroccan context.

16. CHILDBEARING WOMEN'S PERCEPTION ABOUT THE USE OF mHEALTH FOR MATERNAL HEALTH INFORMATION IN RURAL COMMUNITIES, ILE-IFE, NIGERIA

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Introduction:
Maternal health services utilization among rural women is poor and this has been reported as a major contributor to the high maternal mortality in Nigeria. Mobile health (mHealth) has gained opportunities in improving maternal and child health care in rural areas of the developed and developing countries. Harnessing this innovative measure in supporting maternal health care delivery services to the widely-dispersed childbearing women in rural communities will improve access to reproductive health care and reduce maternal mortality. This study aimed at assessing women's perception about the use of mHealth technology for obtaining maternal health information in rural communities.
Methods:
A descriptive community-based cross-sectional study employing quantitative research design was used to assess the perception of childbearing women about the use of mobile health technology for maternal health information in rural communities, Ile-Ife, Nigeria. Multi stage sampling technique was employed to select 410 women of childbearing age (15 to 49 years) who gave birth within the last five years prior to the study. Data was collected over two weeks using structured questionnaires. 403 questionnaires were found suitable for statistical analysis which was performed using STATA version 13 (STATA Corporation, TX, USA). The confidence level was set at 95%. Informed consents from all participants were obtained after full explanation of the study design and purposes. Ethical approval for this study was obtained.
Results:
Findings revealed that majority (91%) of the women possessed mobile phones. However, less than half of the respondents (48%) usedmobile phone for maternal health information with their health care providers. Findings showed that 84% of the respondents had a positive perception about use of mobile health technology for maternal health information. Also women who had good perception about use of mobile health technology for maternal health information had 1.8 higher odds of a skilled attendance for childbirth compared to women who had poor perception (OR=2.77, SE=1.23, CI=6.63). The findings also showed that use of mobile phone between women and their maternity care provider was significantly associated with their perception about use of mobile health technology for maternal health information($X2=4.5305$, $p < 0.05$ (0.033). However,the women's possession of mobile phone had no significant association with their perception about use of mobile health technology for maternal health information($X2=0.1922$, $p > 0.05$ (0.661)
Conclusion
The study concluded that women had a positive perception about use of mobile health technology for maternal health information but poorly utilized mobile phone for maternity care information with their health care providers. Access to and acceptance of information and supports during pregnancy and childbirth by family have important implications for maternal choices of type of maternity care, place of delivery and effective use of available reproductive health services. Expanding mobile phone penetration and network coverage in rural communities can remove traditional, geographic and economic barriers to health care, particularly in emergency situations that can be life threatening, as is often the case for maternal and newborn health. Innovative methods of strengthening the health care system for maternal and newborn health as well as new approaches like mobile health technology which is capable of reaching the hard to reach populations are urgently needed to support Nigeria efforts towards desirable global maternal and child health targets set against the year 2030.

17. Telehealth Nursing Research - Review of Literature 2017

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The purpose of this paper is to present information about telehealth nursing research

worldwide. Telehealth nursing research publications from 2017, with a nurse as first-author, were used as the basis for this presentation. To date, 31 papers have been reviewed for source country(ies), research purpose, research design and findings. Twenty-four papers have authors from a single country and 7 papers have authors from 2 or more countries. In all, 18 countries and five continents are represented, demonstrating the worldwide interest in and commitment to telehealth nursing research. The research purposes described in the papers always concerned aspects of telehealth-telemedicine but they were quite diverse. The papers described information about mHealth users' perceptions; nurses receiving remote direction for stroke assessment and intervention; phone counseling; mHealth interventions for orthopedic surgery rehabilitation, weight loss, hypertension management, online support of urine catheterization, suicide prevention and pain management; smartphone use among nurses and physicians; electronic health record implementation; evaluation of apps and platform availability and efficacy; and nursing students' use of mHealth for care delivery. Thirty-nine percent of the papers used a qualitative-descriptive design, 16% reported a review of literature, 13% were randomized controlled trials or clinical trials and 13% were technology reviews. Other designs included quasi-experimental research, cross sectional surveys, and meta-analysis. Research findings were mixed, with some positive results from interventions but more often no differences were found with the interventions or between intervention and control groups. The three apps evaluations found the apps insufficient and the one evaluation of mHealth platforms found them unsatisfactory. These studies represent a good cross-section of nurses researching telehealth-telemedicine by country and by topic. Continued work is definitely needed to demonstrate telehealth nursing interventions that result in positive outcomes for people with healthcare needs. A reference list will be provided with the presentation.

18. Mobile Teledermatology in Sudan

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Abstract: It is extremely common that many of the population in the rural area may be affected by some type of skin problems, depending on the locale. Skin disease also contributes to significant physical and psychological disabilities, but the importance of skin health is often underestimated because of the chronic, non-life threatening nature of most skin diseases. This clearly demonstrates the important of Teledermatology and the need to find an alternative to the traditional way of treatment to the dermatology diseases for the people in the rural area of Sudan. An android based Teledermatology application was built to assist in diagnosing the dermatology disease with little effort from the side of the health care providers in the rural area of Sudan. Therefore, building an Online dermatology database to be used in several areas. The study will further support diseases control, education, statistics and research by providing an android based system to the health authority in the rural areas to capture and collect patients medical history information with the pictures of the affected skin areas of their bodies.

19. A mixed methods systematic review of success factors of mhealth and telehealth for maternal health in Sub-Saharan Africa

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Access to health care is still limited for many women in sub-Saharan Africa (SSA), while it remains an important determinant of maternal mortality and morbidity. Information and

communication technologies (ICTs), such as mhealth and telehealth, can help to facilitate this access by acting on the various obstacles encountered by women, be they socio-cultural, economic, geographical or organizational. However, various factors contribute to the success of mhealth and telehealth implementation and use, and must be considered for these technologies to go beyond the pilot project stage. The objective of this systematic literature review is to synthesize the empirical knowledge on the success factors of the implementation and use of telehealth and mhealth to facilitate access to maternal care in SSA. The methodology used is based on that of the Cochrane Collaboration, including a documentary search using standardized language in six databases, selection of studies corresponding to the inclusion criteria, data extraction, evaluation of study quality, and synthesis of the results. A total of 93 articles were identified, which allowed the inclusion of seven studies, six of which were on mhealth. Based on the framework proposed by Broens et al., we synthesized success factors into five categories: (I) technology, such as technical support to maintain, troubleshoot and train users, good network coverage, existence of a source of energy and user friendliness; (II) user acceptance, which is facilitated by factors such as unrestricted use of the device, perceived usefulness to the worker, adequate literacy, or previous experience of use ; (III) short- and long-term funding; (IV) organizational factors, such as the existence of a well-organized health system and effective coordination of interventions; and (V) political or legislative aspects, in this case strong government support to deploy technology on a large scale. Telehealth and mhealth are promising solutions to reduce maternal morbidity and mortality in SSA, but knowledge on how these interventions can succeed and move to scale is limited. Success factors identified in this review can provide guidance on elements that should be considered in the design and implementation of telehealth and mhealth for maternal health in SSA.

20. A Systematic Review of Patients Adoption of mHealth in the Developing World. A Proposed Model.

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Background: Patient perceptions and experiences of mHeath systems have been recognized as an important element to consider in the adoption of mobile health based technologies by patients. However, there is limited or no existing framework detailing majority of the issues faced by patients in their use of mHealth in the developing world to serve as blue-print for future effective mHealth implementation by providers. Though many research findings recognize this importance, studies that focus on patient mHealth use, appear to highlight some of the issues faced by patients in an isolated rather than holistic manner. The effect is that there is no encompassing framework or model that serves as a guide for effective implementation of mHealth from the perspective of patients in the developing world.

This review documents the use, successes and challenges of mHealth applications, tools and their deployments in the developing world.

Methods: An electronic systematic literature search was conducted using PubMed and Scopus. Two search strategies were used: the first one was a consolidated search string in PubMed combining the MESH terms, All Fields and the inclusion criteria. The second search strategy was equally a consolidate search string using Scopus. The searches were limited to articles published in English during the period between 2000-2016 exclusive to the developing world. Results from the two databases were combined and duplicated articles were subsequently removed using Endnote. Verification and manual review was done later (MAD). All potential abstracts from the unique results from the two databases were screened and the studies that meet the inclusion criteria were selected for full-text review.

Results and discussion
Sixty-six studies out of the search were finally selected for full text review and analysis of which 53 studies, published between 2008 and 2015, were included in the review base on the inclusion and exclusion criteria. These studies include 6 systematic reviews, 11 qualitative studies, 5 quantitative studies, 4 pilot studies, 7 opinion pieces, 1 action research, 2 conceptual frameworks, 1 literature review, 1 randomized control trial, 1 cohort study, 2 cross sectional studies, 5 mixed methods, 2 evaluation studies, 1 descriptive study, 1 thematic analysis, 1 field study, 1 usability assessment, 1 scoping study.
Further screening was done on the papers identifying factors that promote or impede mHealth in the developing world. The findings were classified under the following headings: "cost, affordability, and incentives" (n = 15), "demonstrating clear benefits to patients" (n = 6), "literacy, training and education" (n = 11), "privacy, confidentiality, and security" (n = 16), "phone ownership, charging and maintenance" (n= 11), "electric power" (n = 4), "social, cultural issues, and local context" (n= 8), "local or national language" (n = 4), "technology infrastructure" (n = 18), "legality, ethics, regulation, policy and standards" (n =5), "access to mobile devices" (n= 4), "availability of sustainable funding" (n= 4), "acceptability and perception of use, and willingness to use" (n = 16), "strong stakeholder collaborations" (n = 12), "government sponsorship" (n= 2), "strong community ownership" (n = 4), "effective communication" (n =7), "evidence of effectiveness of system" (n = 4), "technical competence of healthcare providers / clinicians should be ready to work with the technology, and availability" (n = 6), "inadequate monitoring and evaluation" (n = 1), "patient age" (n = 2), and "reliable identification system" (n = 1).

Conclusions: To achieve maximum patients' adoption of mHealth system in the developing world, future implementation of mHealth should have to address issues identified in the proposed model.

21. A MOBILE TELE-ECG STRATEGY: PROVIDING ASSISTANCE TO GERIATRIC, OUTPATIENT AND PRISON UNITS IN PELOTAS – BRAZIL

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Introduction: In the last few decades the development and subsequent expansion of eHealth has opened doors towards providing diagnosis and specialized advice to underserved, remote and rural communities across the globe. The first steps towards the establishment of Tele-ECG services in the state of Rio Grande do Sul (RS) - Brazil, were given in the year 2000 through the beginning of a regional network covering 4 institutions in the southern region of the state. In the last 4 years, the method evolved to a mobile Tele-ECG platform, an initiative resulting from the start of AGM - a new Tele-cardiology company headquartered in Porto Alegre, capital city of RS. The platform was implemented in the city of Pelotas - around 300,000 inhabitants - providing services to outpatient, geriatric and prison units. Objectives: To describe the implementation a 24/7-basis mobile Tele-ECG network in the city of Pelotas, RS, Brazil, covering outpatient care units, geriatric institutions and a regional prison. Methods: The method was implemented in five public outpatient care units, a geriatric home and a regional prison, all located in the city of Pelotas. The AGM Tele-ECG Network consists of a digital ECG machine manufactured in Brazil, conventional computers installed in the remote institutions, Internet network (bandwidth requirement of at least 1mb/s), a physical area for

ECG recording, a central server and a proprietary software composed in such a way where both patient's clinical information and ECG data are transmitted and stored. Elderly people admitted to the Geriatric institution have an ECG recorded during the first week after arrival and every 6 months, as a routine protocol. Additional ECGs are recorded at any time, in accordance to the request of the local medical staff, at both the Geriatric and Prison units. ECGs are recorded during on duty hours at the public outpatient care units, upon medical request. AGM on-duty cardiologists receive the ECG data and patient's clinical information immediately after recording and uploading the exam from the remote site. Digital ECGs are analyzed at the workstation or through smartphones equipped with both Android® or iOS® technology, after which an electrocardiographic report is sent back. Results: The establishment of the Tele-ECG method in the city of Pelotas started in 2014 in a geriatric institution - 90 elderly people -, followed in 2016 by the implementation of the network in five public primary care units located in different districts of the city: União de Bairros, Salgado Filho, Bom Jesus, Simões Lopes, and Guabiroba, covering a district population of around 80.000 inhabitants. In 2017, the ECG network was also established in a regional prison, an institution housing around 1,100 people. From September 2014 to July 2017, a total of 5,665 Tele-ECGs were recorded and analyzed through AGM platform in the city of Pelotas, including 5,170 (91,26%) from primary care and prison units and 495 (8,74%) from the geriatric home, out of which 3,516 (62,07%) were females. A total of 140 ECGs (2,47%) were requested as urgent exams and 5,525 (97,53%) as routine clinical evaluation. Conclusion: The implementation of a mobile Tele-ECG method allows the provision of timely diagnosis and the immediate adoption of therapeutic interventions in different scenarios of health assistance, valid for routine and urgent cases. In the city of Pelotas, Brazil, patients from several public outpatient care units, a geriatric institution and a regional prison are currently served by a 24/7 Tele-ECG network, an initiative provided by AGM Company and supported by the Health Secretariat of Pelotas.

22. Awareness of Nurses Towards Information Communication (TeleNursing) in Patient Care in Federal Teaching Hospital Ido-Ekiti, Ekiti State Nigeria

Paul I. Sunmbola

23. eHealth, mobile devices and diabetes

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The eHealth pilot is concerned with a data sharing platform between patients, doctors, and further parties, in particular in the context of Type 2 Diabetes. Namely, the developed components will allow patients to record their health data (blood sugar level, weight, blood pressure, etc.) using external mobile devices. The data measured on these devices will be collected by a CREDENTIAL eHealth mobile app, which remotely stores this data. The user can then define who is allowed to access which parts of this medical data, to share specific parts of the measurements, e.g., with the family doctor, diabetologist, nutritionist, or personal trainer. Based on the data they see, they can then provide recommendations back to the user. Because of the confidentiality of medical data, it is of prime importance that only legitimate users are able to access a user's data. Furthermore, because of the potential consequences of wrong recommendations, the authenticity and integrity needs to be guaranteed .

24. Utilization of mobile short message service to enhance uptake of focused ante natal care among rural women

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Background: The Sustainable Development Goals targets a global maternal mortality ratio not greater than 70 maternal deaths per 100 000 live births by 2030. In Kenya the maternal mortality ratio is high at 362 maternal deaths per 100,000 live births. Focused ante natal care approach recommends four targeted visits in which individualized care. Focused ante natal care increases the level of skilled birth attendance which reduces maternal mortality and morbidity. Mobile health has been known to improve outcomes in several health conditions. The aim of this study is to assess the influence of mobile phone short message service on uptake of focused ante natal care and its outcomes among women in Tharaka Nithi County, Kenya. Methodology: A single blind randomized controlled trial was carried in selected rural health facilities. The sample size was 118 respondents for each arm. Random allocation through a computer application to interventional or control arm was done. The interventional group was sent one text message per month from booking to delivery while the control group was not. The short message services had content reminding the women of their next ante natal clinic appointment. Structured questionnaires and key informant interview guide were used in data collection. Chi square and multiple logistic regression were used to draw inferences. Results: The utilization of focused ante natal care for the respondents was 57%. The uptake in the intervention group was 75% versus 10% in the control group. The chances of utilization of focused ante natal care was 27 times more among the intervention group compared with the control group (odd ratio = 27, P<0.001). The intervention also influenced the outcomes of focused ante natal care; namely place of delivery with 98% of the women in intervention group delivering in health facilities versus 78% of the control group (odds ratio 16, P<0.001). Completion of ante natal profile in intervention group was 81% versus 53% in the control group (odds ratio 3.9 p<0.001). The use of health promotion practices was 68% versus 27% in the control group (odds ratio 5.6, p<0.001). Conclusion: mhealth can improve the uptake of focused ante natal care among rural women through timely reminders.

25. Bring in the Drones: The potentials and the perils

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This presentation will consider the use of simple (affordable) drone technologies in the engagement, assessment, and delivery aspects of mobile health. Emergent technologies such as these have been minimally explored for their capacities and potentials to improve health care, measures, and outcomes as well as maximize citizen engagement. In addition, it is imperative to consider the risks of such tools in the evolving health care environment (such as privacy issues, misuse, consent, etc). Our presentation will take us through the technology, its potentials, its limitations, and ultimately a consideration of enabling futures for the appropriate and responsible use of such technological innovations.

26. Vigisense solutions for real-time monitoring of care needs and care provision

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VIGISENSE S.A. develops and commercialises solutions to improve care quality, safety and task management in care institutions:

· nurse call systems,

· sensors systems,

· software and mobile applications.

Vigisense's typical solutions blend data from nurse call and panic button systems, location sensors and other monitoring systems. Vigisense's rule engine and notification engine modules provide highly relevant added value to the data collected and information brought forward to care staff and administrators. Vigisense is renowned in several countries for its care event analysis algorithms, its ease of use, and the interoperability of its solutions.

Vigisense provides to care facilities and organisations solutions for real-time monitoring of care needs and care provision:

· Wireless nurse call and personal safety systems

· Multi-technology alarm transmission platforms

· Patient-centered workflow management solutions

· Solutions to maintain the independence of the cognitively impaired and the elderly people

Vigisense's innovation and product range leverage the latest technologies in radio frequency identification, in real-time locating system, in software development and in telecom to provide extensive features and unprecedented ease of use and peace of mind. Vigisense has developped such an expertise in these domains that the company is also regularly called by players outside of the healthcare field for one-off projects and developpment collaborations.

Vigisense's solutions are strongly user-centered. The company's focus on simplified hardware and more versatile algorithms guarantees prompt adoption by all involved and extended efficiency to benefit organisations to the fullest.

27. Telemedicine: A Value Proposition business model

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In the United States, telemedicine continues to expand as governmental agencies, private insurers, major healthcare institutions and public policy make significant progress adapting to the transformative technology. Major hospital institutions have incorporated telehealth and now offer 24/7 virtual doctor visits. Private health plans and government sponsored health plans offer varying telemedicine benefits and reimbursement on a state by state basis. Private telemedicine companies offer business to business telehealth solutions for corporate employees to have access to acute care for as low as $49 per visit.
Despite the aforementioned strides in the telehealth arena, the business case for telemedicine profitability has yet to be made. The sustainability of telemedicine projects beyond grant funding resources remains a challenge. Physician adoption and consumer awareness correlate and continue to lag.
"The Telemedicine Imperative", Global Telemedicine and ehealth Updates volume 9, 2016, explored the utilization of telemedicine as a transformative tool in the delivery of a blended healthcare model in the occupational health setting. The proposed model was successfully implemented as a pilot for a Fortune 100 corporation in 2017. Telemedicine as a value proposition solution addressed the client's specific problem, improved the situation and provided added benefits.
There are implementation lessons to be learned as the blended model is tweaked for scalability. More importantly, a paradigm shift away from the view of telemedicine as a stand

alone, fixed cost/visit business solution to a value proposition model is important for widespread adoption.

28. Toward Measuring the Network Effect of the Regional Medical Information System

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1. Introduction

The regional medical information network connects medical institutions in the region to share residents' medical records such as images of x-ray and endoscope, diagnosis, history of medical treatment, medication, and so on. As a result, it leads to promote the efficiency of providing medical care, increase wellness of residents, and the reduction of medical expenditures by preventing double medical checks or medications. Toward the age of big data or AI, the medical networks which can collect and save medical information of all residents in the region become more important in all aspects. This paper is based on the field research on regional medical information networks in Japan, and present how to measure economic benefit of the regional information networks from the viewpoint of residents, medical institutions, and local governments which are in charge of health and welfare on the regions.

2. What are benefits of the regional information system

The value of network, economies of network, implies that it increases with the number participants, but this definition is not necessarily useful for measuring its value. Therefore, this paper attempt to measure it by focusing on the stakeholders of the medical information network, namely, (i) residents (patients), (ii) medical institutions, and (iii) local governments.

(i) Residents or patients

ꝏMore detailed explanation

Patients can received more detailed explanation of diagnosis from medical doctors, because all information of patients such as past data of medical checks, examinations, and so on obtained not only one clinic but also those of other medical institutions. Patients can be examined by more data.

ꝏ Reduction of travel costs

Patients need not visit clinic far away, since all clinics are connected via the Internet.

ꝏ Prevention of double examinations and medications.

(ii) Medical institutions

ꝏ More accurate medical data of patients

Medical doctor can make use of all information related to patients through the networks.

ꝏ More detailed and accurate explanation

ꝏ Improvement of efficiency of works inside the institutions

(iii) Local government

ꝏ Reduction of the burden of medical expenditure

Due to the above effect, prevention from worsening and prevention of diseases are achieved implying the reduction of medical expenditure.

3. How to measure benefits

In order to measure the benefits of services which are not traded on the market, this study employs CVM (Contingent Valuation Method) which measures the benefits to residents or medical doctors in terms of WTP, which is the monetary amount which users are willing to pay for receiving the service. By asking the WTP (Willingness to pay) of each patient or doctor, we can estimate the value of regional information system.

4. Results of estimation

This study based on author's questionnaire survey sent to 652 medical institutions and 220 valid replies were received (33.75). Medical institutions were categorized by types, number of beds, and diagnosis and treatment departments. The average WTP of teleconsultation is about JPY 625 (Euro 4.81) per patient. This study also identified the factors which determine

the WTP such as types of medical institutions and treatment department, years of experience of telemedicine, and so on.

5. Conclusion

This study is a first trial to examine the economic benefits of regional medical information system. But further research is required to analyze how to expand the network to cover all medical institutions and how the network reduces medical expenditures of the region.

29. Legal challenges of Cross Border Telemedicine between Morocco and the European Union

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Telemedicine creates new regulatory challenges that are even more complex when the provider is not in the same country as the recipient. Telemedicine becomes cross-border if the patient or the healthcare provider using or delivering telemedicine services are residing in different countries. Cross-border telemedicine presents opportunities for health systems but poses additional legal obstacles. Focusing on European regulation and Moroccan law, this work examines the regulatory challenges associated with cross-border telemedicine in general and between Morocco and the European Union in particular. It is not aimed at advancing solutions. Rather, we seek to raise awareness to legal obstacles standing in the way of cross-border telemedicine. For a national exercise, the question of the place of delivery of the service is minor but it is more complicated when it is a cross-border one as countries present number of differences in legislation, implementation, technology, planning, terminology, semantics, and language. The cross-border practice of telemedicine seems compatible with the rights of the patient as stated by the Directive 2011/24/EU on the application of patients' rights in cross-border healthcare. There are key specific legal issues related to the provision of cross-border telemedicine: licensing/registration of health professionals performing cross-border telemedicine services, the conditions for legal processing of health data (data protection), the right of reimbursement of a cross-border telemedicine act, the determination of potential liability, and the identification of the relevant competent jurisdiction and applicable law. Cross-border healthcare can have advantages for market healthcare as competition from foreign health care providers can increase efficiency. However, reimbursement of cross-border telemedicine is unclear. In Morocco, in order to allow cross-border telemedicine, the policymakers are called to update and extend the national law of telemedicine. Cross-border telemedicine services can be envisaged within the frames of the European Moroccan Association treaty in the context of the advanced status of Morocco. Alternatively, bilateral agreements with the European member states should address the issue.

30. Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study

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Background: Norway has a long history of using telemedicine, especially for geographical reasons. Despite the availability of promising telemedicine applications and the implementation of national initiatives and policies, the sustainability and scaling-up of telemedicine in the health system is still far from accomplished. The main objective of this study was to explore and identify the multi-level (micro, meso and macro) factors affecting telemedicine utilization in Norway.
Methods: We used a mixed methods approach. Data from a national registry were collected to analyze the use of outpatient visits and telemedicine contacts in Norway from 2009 to 2015. Interviews with key stakeholders at national, regional and local level helped complete and contextualize the data analysis and explore the main issues affecting the use of telemedicine by health authorities and hospitals. Relevant national documents were also used to support, contradict, contextualize or clarify information and data.
Results: Telemedicine use in Norway from 2009 to 2015 remained very low, not exceeding 0.5% of total outpatient activity at regional level and 0.1% at national level. All four regions used telemedicine. Of the 29 hospitals, 24 used it at least once over the 7-year period. Telemedicine was not used regularly everywhere, with some hospitals using it sporadically. Telemedicine was mostly used in selected specialties, including rehabilitation, neurosurgery, skin and venereal diseases. Three major themes affecting implementation and utilization of telemedicine in Norway emerged: (i) governance and strategy; (ii) organizational and professional dimensions; (iii) economic and financial dimensions. For each theme, a number of factors and challenges faced at different health care levels were identified.
Conclusions: This study allowed shedding light on multi-level and interdependent factors affecting utilization of telemedicine in Norway. The identification of the main implementation and utilization challenges might support decision makers and practitioners in the successful scaling-up of telemedicine. This work provides a knowledge base useful to other countries which intend to implement telemedicine or other digital health services into their healthcare systems.

31. Knowledge, Skills and Practices of Information and Communication Technology among Public Health Midwives in Hambantota district, Sri Lanka

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Background:
Information and Communication Technology (ICT) makes significant contributions to public health sector. Advancement of using ICT in the public health sector is becoming very common around the world. ICT helps healthcare workers in the Public Health sector to increase their efficiency, improve their service quality and reduce work overload. Public Health Midwife (PHM) is the “front line” healthcare worker for domiciliary care to mothers and children in the community in Sri Lanka. PHMs have evolved to a professional cadre and play a major role in the preventive healthcare more than midwifery. Over past decades, their range of duties has evolved from narrow attending of childbirth to a broader range of promoting maternal and child wellbeing. ICT is encountered of many communities in the daily life. It is important for the top level healthcare management to aware of the knowledge, skills and practices of ICT among PHMs for the planning and implementing functions.
Objectives:
The main objective of the study was to assess the knowledge, skills and practices of Information and Communication Technology among Public Health Midwives in Hambantota district, Sri Lanka.
Methods:
A mixed method cross sectional study was carried out in Hambantota district. The total population of 184 PHMs in Hambanthota district was included in the study. A self-administered questionnaire was used for quantitative data collection and qualitative data

were collected using four focus group discussions (FGD). Each FGD included seven PHMs. Statistical Package for Social Services (SPSS) version 21 was used to analyze obtained quantitative data. Qualitative data were analyzed by thematic analysis.
Results:
Of all the PHMs included in the study (n = 181), more than half (51%, n= 93) were older than 51 years. Majority (90%, n=163) of PHMs believed ICT is an important skill. Of them, 22% (n=39) reported that they were not able to acquire sufficient knowledge due to the lack of available training centers, 24% (n=44) reported lack of time, and 2% (n=3) reported financial constrains. Rest of the 52% of PHMs did not report any constrain for gaining ICT knowledge. However, very few PHMs were using ICT related equipment such as smart phones (17%, n=30), desktop computers (13%, n=23) and laptop computers (12%, n=22). The data storing items were used by only 30% (n=24), while Internet was used by only 18% (n=32). Knowledge was found to be negatively correlated with age, service years and current PHM grade at 95% significance level. Of all, 93% (n=169) reported unsatisfactory level of practices in using ICT related equipment and facilities such as internet, emails, internet banking. The PHMs who participated in FGDs (n=28) reported lack of skill on usage of ICT related applications such as spreadsheet (47%, n=13), word processor (86%, n=24), graphic and multimedia (100%, n=28) and data security (86%, n=24) . Majority of them (86%, n=24) were not used to operate in a password protected environment for data security. It was found that 68% (n=19) of the PHMs were willing to take the responsibility to move forward with the ICT environment.
Conclusion:
PHMs believed that the computer knowledge as an important factor for improvement of their career and service. Their willingness to take the responsibility even with lack of knowledge and practices in ICT related equipment and facilities should be made use for better future of the grass root level of health care workers. It is important to design the training programmes targeting competencies to provide necessary knowledge and skills for Public Health workers.

32. The Facebook strategy for Global ehealth: evidence from social media pages of two televangelical churches targeting patients with chronic illnesses

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The adoption of facebook and other social media by world famous televangelists as a platform to provide interventions targeting patients with chronic illnesses has drawn interest in the field of social media usage and ehealth (Faimau & Behrens, 2016). This comes in an era where the research on the link between medicine and religion has long been established and grown away from a focus on controversies to a focus on how the two can work together for better population health outcomes. Recently platforms such as facebook, YouTube, WhatsApp and live TV channel have grown in popularity to millions of followers across the globe, notably: the Synagogue, Church of All Nations (SCOAN) in Nigeria and the Shepherd Bushiri Ministries in South Africa. Both these churches have a global social media following of a minimum of 1 million fans each (Faimau & Behrens, 2016). The use of social media by these churches in targeting patients with chronic illnesses is of special significance to the field of mhealth and telemedicine as these churches now have their coverage not only at regional level but globally. There is evidence of their outreach to patients with chronic illnesses or the needy as far as South America, North America, Europe, the Indian sub-continent and the greater Asian region. This paper presents a framework understanding the strategies adopted by these two televangelical churches use social media to target patients with chronic illnesses in a way that attempts to bridge the gap between the scientific evidence and religious practice. Evidence is drawn from an analysis 12 live broadcast sessions of TV channels owned by these churches.

33. A Framework for Health Workers' Increased Adoption of mHealth in Developing Countries . A Systematic Review

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Background: MHealth application provides health practitioners an enabling platform to provide services such as manage diseases, facilitate drug adherence in tuberculosis and HIV patients, speeding up diagnosis of HIV and malaria, monitoring outbreaks of epidemic, taking and transferring medical images to doctors, and providing an advice hotline for rural health workers in the developing world, etc. These opportunities have caused many developing economies to invest heavily in mobile telecommunication infrastructure than in road transport and electric power generation. However, these investments have not attracted a reciprocal use effect from health workers in the developing world. This study seeks to develop a framework for mHealth adoption among health workers in the developing world.
This review identifies the challenges, solution, and the area of use of mHealth systems and tools by health workers in the developing world.
Methods: Two electronic databases – Scopus and PubMed were searched systematically base on the inclusion and exclusion criteria. The Scopus search results produced 473 unrepeated articles whiles PubMed produced 385 unique articles. The two searches were then consolidated together eliminating repeated articles to achieve uniqueness. The results after the consolidation revealed 475 unique articles. Three authors with their names abbreviations (MAD, MM and RS) performed the search in October 2016 for papers published between 2000 and 2016. The sorting was done using endnote. Full-text electronic articles were then retrieved from online journals. Papers that were not available were taken out from the list. The authors performed individual verification and reviews, and their findings were put together and later discussed by all three together based on exclusion and inclusion criteria
Results and discussion
The papers that met the criteria were 62 in all and were published between 2010 and 2016.The number of publications types: 5 opinion pieces, 2 implementation studies, 6 usability test, 18 qualitative studies, 8 quantitative studies, 1 Thematic review, 1 Systematic review, 2 mixed methods, 6 evaluation studies, 2 cost analysis studies, 1 social network analysis study, 2 cross sectional study, 1 cluster randomized trial, 2 pilot study, 2 Randomized Control Trial, 2 exploratory studies, 1 baseline study, 1 comparison study, formative studies, 1 Case study.Further screening was done on the papers identifying factors that promote or impede mHealth in the developing world. The findings were classified under the following headings: “cost, affordability, and incentives” (n = 15), “demonstrating clear benefits to patients” (n = 6), “literacy, training and education” (n = 11), “privacy, confidentiality, and security” (n = 16), “phone ownership, charging and maintenance” (n= 11), “electric power” (n = 4), “social, cultural issues, and local context” (n= 8), “local or national language” (n = 4), “technology infrastructure” (n = 18), “legality, ethics, regulation, policy and standards” (n =5), “access to mobile devices” (n= 4), “availability of sustainable funding” (n= 4), “acceptability and perception of use, and willingness to use” (n = 16), “strong stakeholder collaborations” (n = 12), “government sponsorship” (n= 2), “strong community ownership” (n = 4), “effective communication” (n =7), “evidence of effectiveness of system” (n = 4), “technical competence of healthcare providers / clinicians should be ready to work with the technology, and availability” (n = 6), “inadequate monitoring and evaluation” (n = 1), “patient age” (n = 2), and “reliable identification system” (n = 1).
Conclusions: From the review conducted, we proposed a model to be used to achieve increased mHealth adoption by health workers in the developing world.

34. Nursing education based on “hybrid” problem based learning

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Pathophysiology is a core course in nursing curriculums with the intent to bridge the gap

between pathological concepts and clinical reasoning. Students frequently have difficulty in relating pathological concepts in the clinical setting. Thus, a problem based (PBL) hybrid pathophysiology course was designed to enhance student's comprehension of material and application in the clinical setting.
This course totals 6 ECTS (European Credit Transfer System), corresponding to 70 contact hours. Despite the relevance of this scientific area for future nurses, they still experience difficulties in integrating learning from different theoretical contents. The lack of knowledge derived from these difficulties is likely to lead to negative learning outcomes.
Traditional lecture based formats tend to promote "surface learning" while problem-based learning (PBL) promotes "deep understanding" and emphasizes meaning rather than reproduction of facts. PBL seeks to foster active, collaborative and self-directed learning by promoting the use of clinical scenarios (Spiers et al., 2014). Currently, the focus is empowering self-learning which this hybrid course supports. Nurse educators are encouraged to be innovative, developing strategies that provide students with an active learning environment. Evidence highlights that these strategies "might help nursing students to improve their critical thinking" (kong et al., 2014). This will enhance the student's comprehension of lecture content, clinical reasoning (critical thinking) and skill performance.
Aims and strategy:
The main goal of this hybrid model is to promote continuous learning and effective follow-up of course contents, helping students to better assimilate knowledge. Critical clinical reasoning is promoted (Kong et al., 2014), rather than factual memorization. The learning on-line platform "Moodle" was selected as a pedagogical tool to implement this methodology (Shah, Walters & McKillop, 2008). Based on PBL, clinical exercises known as "COW" (case of the week) were developed in order to guide students to reflect on the Pathophysiology of diseases using real-world scenarios and to encourage them to find the most appropriate solutions.
The final grade for this course is composed by the successful accomplishment of the "COWs" (20%) and a theoretical exam (80%).
At the beginning of the course, students are informed about the contents to which the COWs will refer to. After attending the course, students are provided with a personal login and password to access the COWs. The COWs are programmed at the end of the subject lectures.
COWs are composed by a clinical vignette, followed by 10 related multiple answer questions with a progressive background clinical reasoning. A 25-minute time-limit is set: 5 minutes to understand the clinical scenario and 2 minutes to answer each question. During this period the students may freely navigate between questions and the clinical scenario, providing them the opportunity to review their answers.
Results:
This method has been implemented since 2013 and included in each semester of the Pathophysiology course for the 2nd year Nursing Degree students in a Portuguese faculty.
Since its implementation in 2013, the COWs indicators have been excellent. These indicators are: a positive final grade point average for the Pathophysiology course (≥9.5 from a scale of 0 to 20); the high level of students' personal satisfaction and learning outcomes (assessed through an online questionnaire); and the positive feedback from the Clinical Education supervising teachers.
The success of this method is revealed through students' approvals: 126 (41,6%) students in 2012/13 (n=303); 132 (39,3%) in 2013/14 (n=336); and 144 (44,3%) in 2014/15 (n=325). The students' initial concerns such as those related to additional learning requirements and still uncertain results, were ultimately overcome. We expect that this teaching methodology will help students to integrate pathophysiology theory into nursing practice by gradually enhancing their clinical reasoning.

35. Dentistry in the Digital Age: Student Opinions and Perspectives on e-learning

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Considerable attention has been given to the "digital natives" due to their familiarity and reliance on information and communication technology (ICT). ICT is also changing how oral health professionals (OHP) work, acquire knowledge and training, communicate with patients and with their professional network, share knowledge and conduct research and evaluation. When analysing the use of ICT, the opinions of future OHPs was lacking compared to other health disciplines, and no exploration as how digital natives envisages ICT integration with their future practice.
Objectives: Within this context, the present study aimed to qualitatively explore how first year dental students at a large Australian university perceive technology based tools for learning and education, and to assess how incoming students assess the feasibility of their implementation as a learning tool.

Methods: This study involved the participation of 95 dental students, who were commencing their studies at the Melbourne Dental School, The University of Melbourne in 2016. As part of the assessments in a first year unit 'Introduction to Professional Practice', students were required to complete an essay on the topic of 'ICT uses in dentistry', without prior teaching on the topic.

The de-identified essays were collected. Two researchers independently coded the essays coding, inter-observer reliability was tested. Essays were coded with relevant keywords at the paragraph and/or sentence level. Coded essays were inputted into NVivo.

Socio-demographic information was not collected, but available data indicated that the majority of "digital native" students were males (n=52) than females (n=43), with 30% of the cohort being international students (n=29) and 65% of Asian heritage (n=62).

Results: In the broad theme of dental education, multiple sub-themes were encountered; learning preferences, virtual learning, and concerns about ICT in dental education. Another main theme was social media with a sub-theme of student education. Overall, the use of e-learning in dental education was perceived positively. Main obstacles cited for use of ICT in dental education included infrastructural and implementation costs, and software maintenance. Consequently, concerns were raised regarding inequalities amongst communities and countries that may limit the overall student experience. The data also indicated that online learning can be more distracting and lead to reduced class attendance, increased isolation due to less face-to-face interactions.

Conclusion: Overall, ICT was seen as advantageous within the realm of dental education, but it was not without its concerns. The current data suggests that further exploration of student opinions and experiences through qualitative methods, may highlight the need for necessary staff development and formal syllabus changes with respect to dental education.

36. The opinion of Polish nurses about introduction electronical tools in the daily practice

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Introduction
Using electronical tools in the basis practice is an important part of integrating care and can help patients with the self-care in the different setting and nurses with manage the care. Nurses should use them to achieve better quality of care. New strategy for digitalisation was mentioned in the "Policy Paper for Health Care for Poland 2014-2020". Because of this changes, which was happened in the eHealth in Poland it is important to get information about the opinion of nurses on using different electronical tools in daily practice, specially electronical documentation. It is also important receive information before the implementation and involve nurses in this innovation process.
Methods
The survey is the first stage of examination on the digitization of nursing in Poland. The research was conducted on the basis of a questionnaire among respondents with using electronic tools between November 2016 and July 2017, in seven hospitals with the different stage of implementation Electronical Health Record.
Results
The study encompassed a total of 631 nurses, 96,7% were women and 3,3% were men. The median age of respondents was 48 years. The median of their professional experience was 23 years, whereas the median time of work in their current place of employment was 18 years. More than ¾ of the respondents were departmental (ward) nurses, about 15% were unit nurses, and about 10% were midwives. Over 87% of the surveyed nurses overall carried out their duties on computerized workstations ($p < 0,001$), 42,9% of the respondents encountered the electronic patient record (EPR), prior to this study; ⅔ demonstrated a positive attitude to the EPR. 50,5% of the respondents coped with a nursing classification in their quotidian work, whereas 47,2% had to deal with these scales in the course of their professional training. 56% of the study participants considered themselves experienced in working with the EPR; 10,7% out of respondents without experience felt prepared to work with the EPR, 40,1% felt unprepared and 49,2% had no opinion (regardless of their work experience). 47,6% of the respondents expressed their beliefs that, in the future, health care will be based on the EPR, 7,5% was sceptical about it and 44,9% had no opinion (irrespective of their work experience). 76,1% of the respondents used front-end applications to handle social media (videlicet Facebook in 51,9%, Twitter in 6,1%, LinkedIn in 3,9%, ResearchGate in 0,7%; and intranet in 54,5%). The younger the respondents were, the more often, statistically, they made use of these services ($p = 0,004$). The surveyed nurses most often emphasized such aspects of the introduction of EPR as an improved reporting of nursing care (46,6% altogether, 50,5% of the social media users vs. 34,0% non-users; $p = 0,002$), improved patient safety (44,1%, 49,5% vs. 27,2%; $p < 0,001$), greater data security and integrity in comparison to paper documentation (40,9% and 44,8% vs. 28,5%; $p = 0,001$) and time saving (37,6%, 42,6% vs. 21,9%, respectively; $p < 0,001$). Moreover, 44,5% of the respondents declared a desire to broaden their knowledge on e-health and operation of EPR (regardless of their work experience, but in relation, statistically, to the use of social media applications, 49,5% vs. 28,7%, respectively; $p < 0,001$).
Conclusion
The study participants who used the mobile/desktop applications to connect with the social media on a daily basis proved to be more receptive to the computerization of nursing care.
The younger the respondents were will have more motivation with introducing electronical tools to the daily practice.
Nurses should have more information about Nursing Informatics during the education.

37. mLearning as medical education platform for Medical Residents in Sudan

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mlearning in medical education is a means to an end, rather than the end in itself. Utilizing mlearning can result in greater educational opportunities for students while simultaneously enhancing faculty effectiveness and efficiency. This paper discusses the role of the mLearning applications for the medical residents and students in Sudan. The developed application eConsultant is simply designed for one purpose, to serve the doctors in gaining knowledge and learning new and recent medical information all of which have had positive impacts on the health care systems n Sudan and beyond. eConsultant aims to help resident doctors overcoming the challenges facing their careers development, as well as helping the students and Fresh-Graduates. eConsultant is composed of quick diagnostics tools and features used by doctors and laboratory medical scientists in the first module, moving into the pharmacists module (My Medical), to the high level module (specialized eConsultant) and including other two extra modules, one is (My Society) which is linking the doctors to all medical topics and communities over the social networks and the other module is the ICD (International Classification of Diseases).

38. Curriculum Development in eHealth

Dan Gerend

39. Telecardiology: CONTRIBUTION OF ROBOTIC ARM TELE-OPERATED DURING INTERVENTIONAL PROCEDURE OF ABLATION

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Background: Robotic catheter ablation is performed at some centers. Robotic systems could improve navigation of the catheter, keep the catheter in a stable position, and shorten procedure times. In general, robotic catheter ablations have had similar outcomes as traditional (manual) catheter ablation, meaning that the success and complications rates aren't significantly better or worse.
Methods: A robotic ablation starts the same way as a traditional catheter ablation. The physician inserts a catheter into the groin and guides the catheter to the right side of the heart. After making a puncture in the septum, the wall that separates the right and left sides of the heart, the physician leaves the patient's side and goes to the control system for the robotic system, which is usually located in an adjacent room.
Results: Performing catheter ablation with a single point radiofrequency catheter can be technically challenging, particularly for physicians who have not performed many ablations. In theory, using a robot will simplify the procedure and decrease the expertise needed. The primary advantage is that robotic control provides very precise catheter navigation, right to the spot where the operator wants to go. Moreover, once the catheter gets there, it is extremely stable. Catheter instability is one of the reasons for long-term failure of AF ablation. Navigation is also easier with the robot, which will enable less-experienced operators to complete the procedure in a timely fashion. The use of robotic arm during ablation procedure has the benefit to isolate physicians from radiation exposure and eliminates the need to wear protective lead during the procedure. The robotic system can provide significant safety and comfort advantage for physicians.
Conclusion: This type of procedure, which is an important part of telemedicine, will positively impact public health and improve the management of atrial fibrillation, a disease that causes severe complications and negatively affects the prognosis of patients.

39. TELECARDIOLOGY: DEMOCRATIZING ACCESS TO CARDIAC CARE

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Background - Developing countries face a plethora of issues in providing adequate cardiac care. Increased mortality rates, sudden deaths due to the lack of early care and prevention, increased healthcare spending and absenteeism are among the consequences of these issues. Telecardiology enables better access to the diagnosis and management of cardiac conditions. Thanks to decreasing costs and drastically improved technology, telecardiology can save lives, money and resources and revolutionize access to cardiac care in the developing world.
Methods: - Telecardiology is a platform for the processing and remote interpretation of instantly transmitted electrocardiograms. The platform is secure and it respects patient data confidentiality. The electrocardiograms are processed and interpreted by experts which send by telephone their results within 5 minutes of receiving the ECGs. A full written report is emailed/faxed to the user afterwards. All reports are classified by patient and stored at the platform for future use.
Results - Telecardiology has the potential to drastically improve access to reliable cardiac care in the developing world. Some of its most impactful benefits are: faster and more reliable cardiac diagnosis, remote follow-up of implants, democratizing access to cardiac care, saved time and money for patients, empowering general practitioners, enhancing healthcare, etc. - The biggest challenge facing the deployment of telecardiology in the developing world is the cost of the procedure and its coverage. However, economic growth and the development of health insurance create a favorable environment. Other challenges include lack of awareness among healthcare practitioners.
Conclusion- Plummeting costs and increased technological performance are revolutionizing the medical sector, allowing for better, cheaper, and more reliable care. Telecardiology democratizes access to cardiac diagnosis and management in the developing world, which saves lives and promotes health and wellbeing of the populations.

40. The Use of Telemedicine for Patients Needing Organ Transplantation: Barriers and Facilitators

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Purpose: The purpose of this research was to explore the barriers and facilitators to the use of telemedicine in promoting access to organ transplantation as perceived by clinicians and other professionals employing this resource.
Design: Qualitative study, which analyzed the responses of 11 University of Virginia Health System participants who use or coordinate the use of telemedicine to provide care for patients in need of organ transplants.
Methods: A qualitative approach was used to analyze the data. The researcher identified common themes including advantages of telemedicine, facilitators of program sustainability, barriers to transplant telemedicine programs, how the current use of telemedicine in each program could be improved, and overall rated experience.
Results: Saved travel time, convenience for both patients and providers, the ability to increase access to high quality care and reduce variability in patient outcomes were key advantages of the use of telemedicine. The most significant driving force to program creation and sustainment was the presence of a clinical and administrative champion. Technological challenges were the greatest barrier to the use of this clinical resource. Participants identified the important role telemedicine will play in the future delivery of healthcare. All 11 individuals rated positive experiences with telemedicine.

Conclusion: Greater education is needed to increase awareness regarding the full potential of telemedicine and its many advantages. The use of telemedicine in providing organ transplant

care has significant potential to reduce the burden of chronic disease and reduce regional disparities related to access to specialized care.

41. National Network of Teleaudiology in Clinical Practice- Telefitting of Cochlear Implants users

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Introduction
National Network of Teleaudiology (NNT) is easy accessible telehealth applications for patients after cochlear implantation. In order to obtain the best hearing benefits after cochlear implantation, the speech processor must be optimally fitted.
This requires frequent appointments with specialists. Telefitting enables among others: programming electrical stimulation parameters into the patient's speech processor, activation of the speech processor in 'live' mode, consultation about ways to use new settings in the speech processor.
The aim of this poster is to present telemedicine possibilities for cochlear implants users.
Material and methods:
The Internet allows specialists from Poland to set up a teleconference for audio and video contact with the patient and support specialist, and allows remote desktop software to access a remote computer and perform fitting. Every node is equipped with teleconference terminals from Polycom Inc. with LCD screens, zoomable and movable Polycom cameras, connected to a system with symmetrical Internet connections. There is also a PC computer equipped with clinical interface boxes with appropriate fitting software. The 'Logmein.com' application is used for remote control.
Results and conclusions:
Development of informatics and telecommunication technologies opens new possibilities for the patients and the specialists. The model of postoperative care for implanted patients using telemedicine seems to be a reliable alternative to standard model. It should be emphasized that telemedicine methods enable development procedure for cochlear implants system for Least Developed Countries.

42. Hearing screening in school age children in different African countries

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Troubles with understanding of different sounds, delay the speech development and school difficulties may be the result of hearing problems. Consequently, it may negatively impact on self-esteem, interpersonal relations and professional development. Hearing screening program enables early detection of hearing disorders in chosen age group and allows to implement adjustment methods of treatment and rehabilitation.

The aim of this presentation is to show procedure and results of hearing screening in six African countries.
Material and methods
During hearing screening standard procedure was conducted including: Video Otoscopic examination, pure tone audiometry which was performed on Sensory Examination Platform® with audiometric headphones. Also, otoacoustic emission- OAE was carried out. Positive results of the screening test was defined as any hearing impairment greater than 20 dB HL in any ear, at any frequency from 500 to 8000 Hz.
Results
Hearing screening was performed in group of 1198 children in six African countries: in Rwanda- 183 children, Tanzania- 212, Ivory Coast- 132, Cameroon- 260, Senegal- 206 and in Nigeria- 205. Analysis of results showed that hearing problems in African countries are common. Positive results of pure tone audiometry had about 25% subjects however about 40% had positive results of videootoskopic examination.
Conclusions
Results of hearing screening in African countries shows that prevalence of hearing problems is significant. It is important to develop knowledge about otolaryngology especially ear hygiene. Furthermore, neonatal hearing screening ought be the standard procedure. Due to limited financial resources it is important that new solutions should engender significantly less cost.

43. Technologic organizational support for health. Example of health's territory "Alpes du Sud"

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This project is supported by the Strategic Committee of the Territory-Hospital Group (Comité Stratégique du Groupement Hospitalier de Territoire - GHT) of the Southern Alps: telemedicine is a priority axis Shared Medical Project (Projet Médical Partagé - PMP) of the Territory. The project aims to consolidate and harmonize telemedicine practices in the territory. This project is divided into 4 stages:

- Stage 1, concerning patients resident in the medico-social structures, aims to develop the implementation of tools (such as tablets) to reinforce the link between hospital gerontology teams and medico-socials structures: Nursing Home, Inpatient Rehabilitation Facilities, Disabilities clinical staff.
- Step 2: concerns the digitized transmission of Electrocardiograms (ECGs) and functional explorations for diagnostic purposes.
- Step 3, concerning patients with chronic disease, aims to set up parameters monitoring tools for outpatients with chronic diseases: heart and respiratory insufficiency, type 1 and 2 diabetes and substantial wounds.
- Step 4 aims to set up video tools for emergency professionals (Emergency Departments, SAMU-SMUR for French system organisation to provide emergency care in remote areas.

Context
The specificities of the territory and the involvement of professionals make the Southern Alps a territory to experiment for telemedicine. The territory of the Southern Alps has specific features that motivate the deployment of telemedicine by responding to identified health needs:
- Aging of the population
- Isolated populations in the valleys nearby the Durance river (more than 30 min from an Emergency Department),
- Difficult accessibility to care,
- Distance from various hospital (45 min minimum between each Hospital center)
- Mountainous landforms,

- Geo-climatic conditions and seasonal touristic impact on the duration of transferts
- Difficulty of access to medical specialties (60 min minimum,
- Distance from the University Centre (CHU - APHM and Grenoble),
- 25 Nursing homes with a capacity of 1,520 places

Objectives

1. Promote access to care for institutionalized patients in Nursing Home by setting up teleconsultations between the GHT Geriatrics Teams and Nursing Home, Inpatient Rehabilitation Facilities, Disabilities clinical staff in their respective sectors. The geriatric team can call on different skills available within the Hospital (in particular the Mobile Palliative Care Team),
2. Promote the diagnosis of cardiac diseases by digitized transmission of ECG from any health facility in the territory,
3. Promote the management of patients with chronic diseases (chronic heart or respiratory failure, diabetes, wounds ...) by setting up remote monitoring of the physiological parameters between the long-term care homes, Inpatient Rehabilitation Facilities, Disabilities clinical staff of the territory and the GHT hospital teams.
4. Ensure better coverage of remote areas by equipping emergency team workers and Alpine refuges with video-conference equipment, connecting them to the doctors on duty present at the Emergency Departments (15 center), in order to carry out emergency teleconsultations.

Expected benefits

Expected improvements for Step 1:

● Improved follow-up for certain conditions (chronic wounds, behavioral disorders ...) or for end-of-life patients.
● Avoid of preventable hospital admissions
● Reduced patient travel/transfer, limited transportation costs
● Reduced time of care

Expected improvements for Step 2 :

● Early diagnosis of heart diseases
● Improvement of therapeutic strategies
● Optimization of patient transfer modalities
● Securing ECG transfers
● Decrease in transfers and re-hospitalizations

Expected improvements for Step 3 :

● Better patient orientation - decreased transfers, hospitalization time, re-admissions
● Improvement of ambulatory follow-up

● Reduction of transport / costs
● Greater responsiveness / emergency

Expected improvements for Step 4 :

● Improved geographical coverage of emergency care
● Better expertise / improvement of diagnosis during emergency management

44. Portuguese National Centre of TeleHealth: Mapping stakeholders' telehealth knowledge, practice and expectations

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Context and aims
The Portuguese National Centre of TeleHealth (CNTS) was created in October 2016. Its mission is to facilitate the citizens' access to health, to ensure its equity and to increase the efficiency of national resources by taking advantage of information and communication technology. Thereby it supports the broader national strategy of a holistic approach to health, care integration and citizen's empowerment.
The authors identified a clear need to map the stakeholders in the national telehealth ecosystem, to know their vision, learn about their practices and acknowledge their expectations towards CNTS.
Methods:
The authors identified 250 stakeholders from four areas: public health care providers (i.e. hospitals and primary care), academia, healthcare professionals' boards and associations and patients' associations. The private sector was deliberately left out at this stage. Stakeholders were contacted and asked to name a focus point in their organisation.
A questionnaire with closed and open questions was developed aiming at three different dimensions: Telehealth know how and experience, expectations about relationship with CNTS and expectations towards the role of CNTS.
Stakeholders were invited to submit their answers to an online platform. Answers to open questions were individually analysed and categorised.
Results:
From the 250 institutions 238 identified a focus point (95,2%) and 208 submitted answers (84,7%). 47,1% of the responders were public healthcare providers, 15,9% academic institutions, and 37% healthcare professionals' boards and associations and patients' associations or others.
More than half (56%) have know-how and experience in telehealth, mainly in tele-consultations (with emphasis in tele-dermatology) and tele-diagnostics.
Most of the organisations (60%) aim to develop and promote telehealth services, particularly tele-consultations.
54% of organisations declared interest in collaborating with CNTS, particularly in the areas of education and health promotion.
Stakeholders also defined the priority areas that CNTS should focus on. The top 5 were telemonitoring, tele-consultations, tele-education, health promotion and integration of the different levels of care.
Respondents' expectations towards the role of CNTS are: to leverage accessibility as well as to promote geographic equity, the assistance of elderly people and to promote vertical and horizontal care integration.
Conclusion:
There is already considerable knowledge and experience regarding telehealth among Portuguese major health related institutions and associations. Interest in developing telehealth is huge.
CNTS is expected to become an important catalyser in this field, specially in leveraging accessibility and care integration. This absolutely stands in line with its mission.
This kind of exploratory studies of the telehealth ecosystem provide important information and guidance on expectations and needs. They help to increase and foster partnerships towards the development of telehealth in Portugal.

45. Exploring factors associated with the uneven utilization of telemedicine in Norway: a mixed methods study

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Background: Norway has a long history of using telemedicine, especially for geographical reasons. Despite the availability of promising telemedicine applications and the implementation of national initiatives and policies, the sustainability and scaling-up of telemedicine in the health system is still far from accomplished. The main objective of this study was to explore and identify the multi-level (micro, meso and macro) factors affecting telemedicine utilization in Norway.

Methods: We used a mixed methods approach. Data from a national registry were collected to analyze the use of outpatient visits and telemedicine contacts in Norway from 2009 to 2015. Interviews with key stakeholders at national, regional and local level helped complete and contextualize the data analysis and explore the main issues affecting the use of telemedicine by health authorities and hospitals. Relevant national documents were also used to support, contradict, contextualize or clarify information and data.

Results: Telemedicine use in Norway from 2009 to 2015 remained very low, not exceeding 0.5% of total outpatient activity at regional level and 0.1% at national level. All four regions used telemedicine. Of the 29 hospitals, 24 used it at least once over the 7-year period. Telemedicine was not used regularly everywhere, with some hospitals using it sporadically. Telemedicine was mostly used in selected specialties, including rehabilitation, neurosurgery, skin and venereal diseases. Three major themes affecting implementation and utilization of telemedicine in Norway emerged: (i) governance and strategy; (ii) organizational and professional dimensions; (iii) economic and financial dimensions. For each theme, a number of factors and challenges faced at different health care levels were identified.

Conclusions: This study allowed shedding light on multi-level and interdependent factors affecting utilization of telemedicine in Norway. The identification of the main implementation and utilization challenges might support decision makers and practitioners in the successful scaling-up of telemedicine. This work provides a knowledge base useful to other countries which intend to implement telemedicine or other digital health services into their healthcare systems.

46. Needs and requirement analysis of health professionals in rural areas – opportunities and barriers for the implementation of eHealth solutions in Figuig / Morocco

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BACKGROUND:
In rural and remote areas like Figuig/Morocco the access and the availability of educational services and healthcare is clearly underprivileged compared to cities. The shortage of healthcare personnel and health services in rural communities is a worldwide, notoriously and serious problem. The oasis city Figuig, where this research takes place is located in the north-eastern area of Morocco on the border to Algeria, six hours away from the next big city.

Since the border has been closed due to political tension the former busy caravan hub suffers from serious isolated, this includes an underserved healthcare sector.
OBJECTIVE:
Implementation of eHealth solutions, to improve healthcare systems requires a good understanding of the local context. In the case at hand, a qualitative research was used to identify the needs and requirements of eHealth solutions in rural areas in general and in particular, to find out about the specific needs of Health professionals (HP) in Figuig.
METHODS:
Qualitative approach was used to enter the research field, to generate new research questions and to open up new areas of interest. The research was performed with two expert groups by using semi -structured expert interviews. Expert group A were HP from Figuig and the interviewees from an expert group B are working in the healthcare sector in leading positions and have a board knowledge in the healthcare sector, eHealth market and Morocco. The interviews were recorded, transcribed and finally paraphrased following the rules of the qualitative content analysis. The Interviews were evaluated with the computer-assisted analysis software MAXQDA12 by using main and subcategories.
RESULTS:
For a good evaluation structure the following main categories were used: patient treatment, health professionals, eHealth technologies, healthcare service.
The HP in Figuig had only a little knowledge about existing information and communication technologies (ICT). But they were especially interested in using telemedicine to consult specialists regarding chronically ill patients and also for documentation purposes, like an electronic health record.
Expert group B had a very differentiated view in all the main categories and as well as expert group A their named several challenges and success factors. Nevertheless, they also addressed concrete ideas of eHealth solutions and named several examples.
This research makes general information available regarding success factors and possible challenges for implementing eHealth technologies. But the Interviews also provided specific information in this particular setting in Morocco. This allows proposing and address tailored eHealth solutions for this setting.

CONCLUSION:
On the African continent the use of eHealth technologies is increasing, an improved access to health care has the potential to assist in addressing this problem such as resource deficiencies. The needs of HP in rural and remote areas cannot be seen independently from the existing challenges and success factors in those settings. The Moroccan healthcare system confronted many challenges, which were detailly mention in the interviews. But Morocco is also an country with a incising use of smartphones and a digital agenda, connecting all of Morocco until 2022. This digital infrastructure makes Morocco to an interesting setting for country eHealth pilot projects. It is important and necessary that software solutions meet the specifics of the health systems and the local circumstances.
The Interviews provided specific information in this particular setting in Morocco. This work also recommends and address tailored eHealth solutions for this setting and opens up opportunities for piloted projects and further research.

47. Canada's Tele-Pediatric Intensive Care Unit multi-Site Program: Effectiveness of tele-consultation on Children admitted to Remote Pediatric Inpatient Unit

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Introduction: many hospitals in the region around Montreal have only pediatric inpatient units without access to Pediatric intensive care unit (PICU). Some of them need to consult some PICU intensivists or transfer patients to other hospitals equipped with PICU services. At present, the exchange of information and consultation is carried out by telephone call and e-

mail. It is an unsecured transmission of confidential medical documents (e.g. radiographs sent by email or text message, medical questions discussed by email, etc.). Furthermore, Pediatricians need, to improve the communication of clinical data with the PICU intensivists, a better technology that can provide a user-friendly platform able to produce a hyper-presence scene between physicians. that's why, it will be pertinent to set up a new telemedicine service to guide medical decision-making whether it is : transfer a patient, remove uncertainty about a diagnosis and/or optimize the management of a patient. Based on the above, patient care could be improved if a reliable, easy-of-use and secure exchange of patient data took place before launching classical consultations and/or transfers.
Objective: we aim to assess the feasibility of synchronized teleconsultation sessions between first line pediatricians and PICU intensivists via the REACTS platform and measure the impact on physicians and patients admitted to the pediatric units of two remote hospitals.
Method: a retrospective and cross-sectional design was adopted. Three hospitals were included in the study (one university hospital and two remote community hospitals) with 42 pediatricians and PICU intensivists recruited for the sample. Four outcomes were examined:
-Feasibility of teleconsultation sessions (Clinical and Technological)
-organizational and operational impact (speed of access to the university hospital resources, number of transfers, quality of patient care).
-satisfaction of the pediatricians consulted (teleconsultation utility, platform effectiveness)
-impact on knowledge transfer (development of clinical expertise, knowledge transfer).
Questionnaires and measurement tools were developed on the basis of the conceptual model: The DeLone and McLean Model of Information Systems Success.
Results: Teleconsultation program results in a better exchange of information, lower risk of complications and mortality (mortality decreased by 18%), reduced length of stay, a better quality of care offered, all by secure ways. Regarding the transfers, a considerable decrease (38%) was observed in the number of transfers to the university hospital. And in case of transfer, remote pediatrician noticed an optimization of the support for transfer to the expert center. Concerning the medical conditions, our study revealed an improvement in the clinical management of children and medical stabilization of patients at remote sites. In terms of accessibility, remote pediatricians emphasize an increase (42%) in the rapidity of access to pediatric intensive care. Thus, adoption of such service in pediatric services has also resulted in higher pediatrician satisfaction and increase in the level of confidence of the various stakeholders.
Conclusion: The teleconsultation service is feasible, sustainable, and most often designated for complex pediatric cases. The quality of pediatric care delivered through this telemedicine' service is improved.

48. Applications of Open Government Data in Perinatal Healthcare

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Taiwan has been committed to open government data (OGD) policy since 2012. With a total of 29,084 government datasets had been opened, Taiwan retained top-ranked among 94 surveyed countries according to the Global Open Data Index published by the U.K.-based Open Knowledge International (OKI) in 2016. Moreover, Taiwan led 12 out of the 15 key categories used to gauge the status of OGD with 100 percent openness.
Taiwan government also adopted numerous measures to enhance the accessibility and applications of the OGD. In health sector, Taiwan Health Promotion Administration (HPA) established an open data platform in 2013 and furtherly encourage enterprises, NGOs, academies and even individuals to make greater use of available datasets to promote health in a wide range.

The application of OGD in perinatal healthcare has been proven a successful example. The HPA fully subsidizes 10 prenatal check-ups for each pregnancy. Nearly 98% of the eligible women take at least 4 of those free examinations. Hospitals and clinics have to report their specialists, facilities, service items, and actual utilization to the HPA in order to get reimbursed. Currently, these comprehensive setting-specific data and utilization statistics are open for value added uses, such as guiding Apps on mobile devices or portraits of prenatal health behaviors.

Another application of OGD is for breastfeeding promotion. Taiwan HPA took WHO's recommendation and pushed forward a breastfeeding policy in 2001. However, most Taiwanese women hesitate to breastfeed in public. Responding to this culture consideration, an act was passed in 2010 requiring the majority of public places as well as long distance traffic vehicles or stations provide private breastfeeding rooms. During the past 7 years, more than 3,300 breastfeeding rooms have been set all over Taiwan. Health authorities regularly inspect those rooms and maintain comprehensive datasets of relevant information.

In 2013, the HPA sponsored a program for innovative uses of this breastfeeding OGD. Its first application was an App developed by the Mother and Baby magazine to provide postpartum women with information about the nearest breastfeeding room anytime, anywhere. That App became in great demand as its subscribers shortly exceeded 20,000. At present, there are 8 popular Apps relating to breastfeeding in Taiwan, and 5 of them use the open data released by Taiwan HPA.

The OGD also facilitates in improving maternal-hood health literacy through customized health information provision, clarifying misconceptions of pregnancy, updating the list of baby-friendly settings, and circulating latest information of support group activities. Its wide applications not only empower perinatal women for self-management, but also nourish an environment to support healthy perinatal behaviors.

49. An Evaluation of Framework Constructs Intended For Use In Botswana and other Developing Countries for e-Health Readiness Assessment

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Introduction: Implementation of information and communications technologies (ICT) for health otherwise known as e-health is on the rise worldwide including in Botswana, a developing country in Africa. e-Health implementation has been unsuccessful in many instances with an implementation failure rate of 70% having been cited in either institutional or country settings. One of the contributing factors towards the failure of successful e-health implementation can be attributed to lack of e-health readiness prior to e-health implementation. e-Health readiness has previously been cited as the preparedness of healthcare institutions, communities, and/or individuals for the anticipated change brought by programs related to ICT use. As such it is always advisable to carry out an e-health readiness assessment, no matter the setting, prior to e-health implementation. The beginning of a successful e-health readiness assessment calls for the development of an e-Health Readiness Assessment Framework (e-HRAF). An e-HRAF can be described as a tool with which the readiness of an entity or person to implement e-health can be measured. The authors have previously reviewed existing e-health readiness assessment frameworks and found that none were suitable to assess e-health readiness in the context of developing countries such as Botswana .The aim of this study is to develop an e-HRAF suitable for assessing e-health readiness in the context of developing countries such as Botswana.

Methods: Interviews were conducted with individuals and organizations considered as having a role in the successful implementation of e-health in Botswana. The spectrum of

experts interviewed were Botswanan communications regulatory authorities, heads of district health management teams, hospital managers, managers in the informatics and telecommunications industry in both government and private sector, community leaders, ICT heads of department in their various portfolios as well as ICT personnel in their various capacities with an interest or perceived interest in e-health. A total of 18 interviews were conducted with some of the experts based in rural settings and others in urban settings across Botswana. The interview format was face-to-face structured interviews which were digitally recorded. In instances where the interviewees responded in Setswana language, back translation was done with the discrepancies in responses settled through an amicable understanding by the parties involved. Thematic analysis of the results was conducted using NVivo 11 software, to assist in identifying and extracting insight related to each initial or emerging theme, or sub-theme.
Results: Through the interviews conducted, ten themes were identified, some with sub-themes, as having a contribution towards successful implementation of e-health in Botswana and hence fit to become constructs of an e-HRAF for developing countries such as Botswana. The ten themes consisted of an overarching theme of institutional capacity, and access to e-services, resources, literacy, security, stakeholder role, governance, public private partnership, e-health requisite as well as population distribution. The themes and subthemes will serve to augment those identified from the literature regarding existing e-health readiness assessment frameworks, leading to development of a more comprehensive e-HRAF. Based on this insight, e-HRAF related questionnaires will be developed to provide specific tools for e-health readiness assessment within the context of developing countries.
Conclusion: An evidence-based e-Health Readiness Framework is being developed to help Botswana, and potentially other developing countries, to ensure their setting (facility, government, or individuals) is ready for introduction of e-Health initiatives, which is expected to enhance the rate of successful e-health implementations.

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