Challenges and opportunities for Telemedicine in Morocco

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Plan

- Health System in Morocco
- ICT Infrastructure in Morocco
- Examples of Telemedicine initiatives in Morocco
- Challenges for implementation
- Future
General Perspective

- Telemedicine in Morocco presents opportunities for the health systems but faces and poses numerous technical, legal, and cultural obstacles.

- Telemedicine is not well developed BUT the awareness of health professionals and policy makers is growing.

- Number of telemedicine initiatives have been launched in various areas: elearning, teleoncology, telecardiology, teleechography, etc…

- The positioning of the government is not yet well defined however a primary law for telemedicine has been passed.

- Factors of success and challenges toward deploying sustainable e-health services exist.
National Health System in Morocco

- The Moroccan health system is organized with a predominance of the public sector, characterized by the free health care services and centralized management.

- The State is positioned at the center of the health system.
  - The Ministry of Health runs the Basic Care Health Network, Hospital network and the National Institutes and Laboratories. Local governments have Municipality health services.

- Most health providers and health care centers are located in urban areas.

- The health system is organized according to a pyramidal hierarchy.

- In quite large areas, only 6 doctors for each 40,000 people / one hospital bed for every 3,000 people.
Challenges in Health System

- Only 6 doctors for every 10,000 people
- 60% of the 35 million population living in rural areas
- Drain brain: Estimated 6,000 MDs living abroad

- New contact per personne per y.: 0.6
- Low Hospitalisation rate: 5%

- Low density of physicians (0.62 for 1,000);
- Low density of nurses (0.97 per 1,000).
- High geographic Concentration
Morocco ICT infrastructure

- The most advanced ICT infrastructure and telecom markets in Africa.
- Increasing broadband access nationwide (fiber-optic networks into more isolated regions and a 4G network)
- Mobile phone subscribers grew by 7.93% y-o-y to reach 41.32m at end-September 2013, representing a penetration rate of 133%, one of the highest in Africa.
- The number of subscribers accessing the internet through ADSL also increased, rising by 21.7% y-o-y.
- A high level of internet access with 51% of the population in 2012.

However the country will need to inject more trained staff into its workforce to fully realize the benefits of an expansion in digital services.

A National Broadband Plan was launched in 2012, with the purpose of providing fixed or mobile broadband access to the whole population by 2022.
HOUSEHOLDS AND INDIVIDUALS EQUIPMENT
(% of individuals aged 12-65 in electrified area; % of total households in electrified area)

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www.anrt.ma - Agence Nationale de Réglementation des Télécommunications (ANRT)
INDIVIDUALS EQUIPPED WITH MOBILE TELEPHONY
(% of individuals aged 12 to 65 in electrified area)
Connectivity in Morocco

- 2/3 internauts connected from home
- 23% connected from mobile (2013)
- 9% citizen use e-gov services
- Morocco 1\textsuperscript{st} country in the Maghred and the 4\textsuperscript{th} in Africa
- 27\textsuperscript{th} / 198 countries in term of internet users (2012). 20Millions users
Examples of Telemedicine initiatives in Morocco
Not developed but the awareness among professionals and policy makers is growing.

- **Tele education (telecadiology):** Child Hospital of WDC with Child Hospitals of Rabat and Marrakech

- **Tele echography (3G Mobile Ultrasound Patrol):** Diagnosis of Pregnancies with risks; Fes region Fes, Meknes, with Casablanca and Paris.

- **Mobile Health Tuberculosis:** Korean Cooperation, Pilot Project in Sala

- **Tele mammography:** Oncology Institute of Rabat & Cancer Institute of Brussels

- **Rendez-vous online:** National deployment
Telecardiology Partnership with Marrakech, Morocco: Supporting Pediatric Cardiology in the Developing World

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Washington, DC¹ and Marrakech, Morocco²
US Morocco partnership for Telecardiology

- In 2005, Children’s National Telemedicine program supported the establishment of a pediatric teleeducation network with Morocco.
- This project resulted in the installation of a telemedicine station in Rabat and training of 40 physicians and staff.

- A second donation was made in 2009 to fund cardiac surgical trips to Marrakech.

- The goal was to augment the skill level of the pediatric cardiovascular team through telemedicine and onsite visits.

- Considerable improvement in echocardiography skills was observed.

- Focus on barriers including technology, satellite availability, language, and time difference has contributed to the success of the project.
Morocco Telemedicine

• Distance education: Rabat Children’s Hospital
  – Diabetes
  – Gastroenterology
  – Nutrition

• Cardiology/cardiac surgery collaboration: Marrakech
  – Mohammad VI University Hospital
  – Hospital Ibn Tofail
Marrakech Telecardiology

- Help to build sustainable cardiac surgery program
- Education exchange on the ground
- Weekly live case discussions with cardiac surgeons and cardiologists
- Meet with Moroccan and US government officials
Marrakech Telecardiology Results: 2011 – 2012

- 25% of patients discussed had surgery
- ½ of the patients undergoing surgery had change in plan
- 3 operations performed for first time in infants
  - Tetralogy of Fallot
  - AV canal defect
  - D-Transposition

www.ChildrensNational.org
Barriers

- Technology
- Bandwidth
- Satellite time
- Time zone
- Language
- Funding
Marrakech Telecadiology project: Conclusions

• Feasible and effective means of building a clinical and educational collaboration

• Telemedicine can augment the diagnostic and surgical skills of a cardiovascular surgery team in an emerging nation

• Sustainability based on dedication of personnel, reliable technology, consistent bandwidth and ongoing funding
Mobile health Tuberculosis

- mobile health Tuberculosis pilot project in the city of Sala (Rabat area) with the Korean Cooperation and Moroccan league against tuberculosis (March 2014).

- This innovative concept in the treatment of tuberculosis equips patients with a smart box that detects patients who leave treatment.

- The Mobile Health Tuberculosis is a simple and inexpensive way to careful monitoring of the patients and better coordination among stakeholders.
Mobile health Tuberculosis: Monitor TB Patients’ Drug Doses

- Monitor TB Patients’ Drug Doses

25 March 2014

Tuberculosis is easily cured if patients take medications on the prescribed schedule. Failure to take tuberculosis (TB) medications on schedule leads to drug-resistant TB strains and broader transmission of the disease.

The Mobile Health Tuberculosis project aims:
- improve adherence to treatment for tuberculosis patients by strengthening direct supervision
- Targets the TB patients, abandoning patients, health staff and community workers.

Mobile health Tuberculosis enlargement
29 October 2015- second phase

South Korean Ambassadeur Dongsil PARK and Director at the MoH, Morocco

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Legal Issues:

Dahir n° 1-15-26 du 29 rabii 11 1436 (19 février 2015) portant promulgation de la loi n° 131-13 relative à l'exercice de la médecine.

- The new law for Medical Practice published in 2015 contain one section dedicated to Telemedicine for the first time

- N° 6344 28 journada 11436 (19-3-2015)
- BULLETIN OFFICIEL p1047
Section 4. Loi De la télémédecine

Article 99
Dans l'offre de soins et de services de santé, les médecins pratiquant dans les services publics de santé et les médecins exerçant dans le secteur privé ainsi que les établissements de santé publics et privés peuvent recourir à la télémédecine dans le respect des dispositions du présent titre et de celles prises pour son application …..

La télémédecine consiste à utiliser à distance, dans la pratique médicale, les nouvelles technologies de l'information et de la communication……

Elle permet d'établir un diagnostic, de requérir un avis spécialisé, de préparer une décision thérapeutique, de réaliser des prestations ou des actes de soins, ou d'effectuer une surveillance de l'état des patients…..

Article 100
Les médecins exerçant au Maroc peuvent faire appel, dans le cadre de la télémédecine et sous leur responsabilité, à l'avis de médecins exerçant à l'étranger ou à leur collaboration dans la réalisation des actes de soins……

Article 101
Aucun acte de télémédecine impliquant un patient ne peut être réalisé sans le consentement exprès, libre et éclairé du patient concerné…..

Article 102
Les actes de télémédecine et les conditions techniques de leur réalisation ainsi que les modalités nécessaires à l'application du présent titre sont fixés par voie réglementaire.
Pilot study in Morocco: mHealth ecography for rural areas

mHealth for maternal and child health

Access to this *Mobile Ultrasound Patrol* technology can improve the state of maternal health in Morocco.

Qualcomm Wireless Reach project called *Mobile Ultrasound Patrol*: Midwives, nurses and general practitioners at health houses (small rural clinics) in three Moroccan villages were given portable ultrasound units, 3G-enabled smartphones, phablets, remote diagnostic software and 3G connectivity for use in the early detection and treatment of major causes of maternal mortality.
Tools allowed the local health workers to capture and wirelessly transmit ultrasound images with near-perfect clarity to specialists at hospital clinics in Casablanca and Fez, Morocco, and Paris, France.

This project enabled physicians located in different cities to quickly review the same data and collaborate on patient care.
Among the trial project’s results:

- Of 575 exams wirelessly transmitted to clinicians, 94 exposed potential at-risk pregnancies and 158 were flagged for a second opinion

- The use of wireless technologies:
  - slashed delivery of medical data for review from four days to two second
  - cut diagnostic review or second opinion time from two weeks to less than a day
  - reduced ultrasound costs from US$80 to US$2 per patient
  - increased local health workers’ skills in delivering high-quality ultrasound images

- The number of women giving birth in health houses increased after the trial
The Mobile Ultrasound Patrol Project

- **SonoSite Fuji Film** provided the ultrasound equipment
- **Sony** provided the mobile phones and tablets
- **Trice Imaging Inc.**, a world leader in mobile imaging solutions, initiated and managed the project
- **Qualcomm Wireless Reach™** was the main project funder and provided project management support

The goal of the Mobile Ultrasound Patrol Project in Morocco was to validate how advanced wireless technologies and connected portable ultrasound devices can provide access to state-of-the-art imaging diagnostics in places it has never been available before, at a significantly lower cost.
Belgian Moroccan cooperation in telemammography project

- The ability to provide early diagnosis has a strong impact on the cancer survival.

- In 2007, a partnership agreement between the Lalla Salma Foundation Against Cancer and the Brussels Center Coordination for breast cancer screening helped to set up a breast cancer screening program by telemammography.

- The digitized mammograms performed at the Oncology Center of Rabat (INO) and interpreted locally by Moroccan radiologists, are then sent to Brussels for a second reading.

- This method reduced the risk of errors of interpretation and diagnosis.

1 200 women were screened from the Region of Rabat.
5 cases detected (world incidence 89/100 000)

[Cette méthode de dépistage s’avère non efficiente dans le contexte marocain].
Report - Lalla Salma Foundation 2006-2010
Telemammography steps

1- Réalisation de la mammographie

2- Numérisation

3- Transmission et lecture simultanée à Rabat et Bruxelles

From: A Sqalli Houssaini et al. - INO - Rabat
# Telemammography experience Impact

## Belgium

- Continuous development and confrontation of results from Brussels with the ones from a different and developing country
- Comfort Brussels as cross point of telemedicine and favor the emergence of medical teleservices that can be exploited at the international level
- Consolidate the Belgium image as supportive country and place of knowledge sharing

## Morocco

- Valorization and better use of the important potential of ICT in Morocco
- Design and Development of screening campaign using the potential of telemammography
- Develop teletraining and Scientific Research

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Digitalization facilitates the second opinion

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Recently, at the government world summit in Dubai 2016, Rendezvous apps from Morocco bagged the award in the one-stop app category, on the regional level in the health sector.

- The app manages hospital rendez-vous, appointment schedules, etc.
- This service has been generalized since January 2016 to all hospitals in the kingdom.
Challenges for telemedicine implementation in Morocco

- Most of the initiative cited above did not move beyond the pilot phase.
- In term of infrastructure Morocco retains one of the most advanced ICT infrastructure in Africa and the highest mobile penetration rates in the region.
- However, number of challenges remain to be overcome including the lack of a national ehealth strategy and legal framework; privacy concerns; weakness of information infrastructure in the hospitals; and lack of skilled personnel.

- Further ethical issues include patient rights, quality standards, data ownership, providing information and collecting patient consent.

- Technical issues includes interoperability and standardisation.

- The challenge of availability of powerful infrastructure concerns the ability for the providers to enable full connectivity across all the country, security of the network, reliability and accuracy of telemedicine applications.

- Many clinics exist in places where there is little reliable electricity, making it difficult to deploy ICT technology solutions.
Major Constraints and Limitations

• Lack of awareness of Health Professionals and Decision makers

• Weak regulation for telemedicine and eHealth practice

• Lack of dedicated IT Infrastructure in hospitals and Health institutions
Conclusions and Recommendations

- These many issues require immediate intervention by the ministries of health and digital economy.

- The mission of IT departments in ministries of health needs to be defined.

- The strategic introduction of e-health initiatives in Morocco can be a key driver in helping realize Morocco objectives of its National Health Strategy.

- The recent award at the world summit government for the Rendez-vous application will boost further the growing interest by officials.

Recommendations

1. Development of plans for the introduction of medical informatics in the whole health system so as to cover the needs of users.

2. Allocation of financial and human resources to support health informatics plans.

3. Promotion of public awareness to sensitize health care professionals.