TELEMEDICINE AND ELECTRONIC HEALTH RECORDS IN JORDAN: THE FUTURE OF HEALTH COMMUNICATIONS IN JORDAN

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Chairman of E-Health Solutions
The objectives of the lecture are:

1. Show the current situation in Jordan regarding telemedicine
2. Show the current situation in Jordan regarding electronic health records
3. Discuss how the two projects are working hand-in-hand to improve patient care
4. Discuss the future plans for the two projects
5. Discuss the future plans for using other technologies that will complement the two projects, especially in the ICU setting.
Telemedicine In Jordan
Jordan Healthcare Initiative

June 2014

Jordan Government

A Strategic Partner
Tele-Health Pilot Architecture

- TeleHealth (Cisco HealthPresence Solution) Pilot in 3 locations
  - 2 patients sites (doctor site) – Al-Mafraq Gov. Hospital and Queen Rania Hospital
  - 1 specialist site – consultant site – Prince Hamzah Hospital
  - Data center at the MoH
• **VTC CODEC** – Coder/Decoder – heart of the system. **Video**
• **Camera** – specifically designed - High Definition
• **Video Monitor** - television-like monitor or computer monitor
• **Microphone** – a microphone is needed at each endpoint to pick up sound for transmission
• **Speakers** – allow the user to hear the sound from the far end
• **Accessories** – include diagnostic peripherals, such general exam cam, stethoscope, ultrasound, ECG, dermascope, document camera, otoscope, ophthalmoscope
Cisco HealthPresence – in Production
Cisco HealthPresence – in Production
Patient site 1 – Mafraq Governmental Hospital (MGH)

- Started in 6/2011
- Total patient consultations up to 6/19/2014 is 850 consultations
- Services Specialties: Dermatology, Cardiology, Nephrology
- Supporting Specialist site provides: 3 dermatologists, 2 nephrologists, 3 cardiologists

<table>
<thead>
<tr>
<th>Number</th>
<th>Patient Groups</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>226</td>
<td>Dermatology</td>
<td>26%</td>
</tr>
<tr>
<td>226</td>
<td>Nephrology</td>
<td>26%</td>
</tr>
<tr>
<td>405</td>
<td>Cardiology</td>
<td>47%</td>
</tr>
<tr>
<td>69</td>
<td>Children</td>
<td>8%</td>
</tr>
<tr>
<td>774</td>
<td>Adult</td>
<td>90%</td>
</tr>
<tr>
<td>14</td>
<td>Age NA</td>
<td>2%</td>
</tr>
<tr>
<td>389</td>
<td>Male</td>
<td>45%</td>
</tr>
<tr>
<td>468</td>
<td>Female</td>
<td>55%</td>
</tr>
</tbody>
</table>

MGH Patient Groups Up-to-Date

- Dermatology: 25% (26% of 90%)
- Nephrology: 26% (26% of 90%)
- Cardiology: 47% (47% of 90%)
- Children: 8% (8% of 90%)
- Male: 45% (45% of 55%)
- Female: 55% (55% of 55%)

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Patient site 2 – Queen Rania Governmental Hospital (QRH)

- Started in 9/2012
- Total patient consultations up to 6/19/2014 is 1366 consultations
- Services Specialties: Dermatology, Cardiology, Nephrology
- Supporting Specialist site provides: 3 dermatologists, 2 nephrologists, 3 cardiologists

### QRH Patients Groups Up-to-Date

<table>
<thead>
<tr>
<th>Number</th>
<th>Patient Groups</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1153</td>
<td>Dermatology</td>
<td>84%</td>
</tr>
<tr>
<td>109</td>
<td>Nephrology</td>
<td>8%</td>
</tr>
<tr>
<td>104</td>
<td>Cardiology</td>
<td>8%</td>
</tr>
<tr>
<td>490</td>
<td>Children</td>
<td>36%</td>
</tr>
<tr>
<td>876</td>
<td>Adult</td>
<td>64%</td>
</tr>
<tr>
<td>0</td>
<td>Age NA</td>
<td>0%</td>
</tr>
<tr>
<td>551</td>
<td>Male</td>
<td>40%</td>
</tr>
<tr>
<td>815</td>
<td>Female</td>
<td>60%</td>
</tr>
</tbody>
</table>
Specialist site – Prince Hamzah Hospital

- Services Specialties: Dermatology, Cardiology, Nephrology
- Supporting Specialist site: 3 dermatologists, 2 nephrologists, 3 cardiologists
- Clinics operations for both Patient Sites:
  - 4 days a week with a total of 12 hours weekly for both sites, distributed as follows:

```
Day     Clinic     Hours per clinic | Daily hours
Sunday  Dermatology  2              | 2
Monday  Nephrology   2              | 4
         Cardiology   2              |
Tuesday Nephrology   2              | 4
         Dermatology  2              |
Wednesday Cardiology 2              | 2
```

- 4 hours for dermatology, 4 hours for nephrology, and 4 hours for cardiology
Tele-Health: Jordan

Mobile Health

- Partner with Jordan Breast Cancer Program (JBCP) in association KHCF to outfit - two mobile cancer screening clinics with Cisco technologies
  - Audio/Video Conferencing Solution
  - Image Transfer (network and Security) Solutions from mammography unit to PACS at King Hussein Cancer Center
  - Digital Media Signage
- 464 female screening cases and 1850 images transferred.
- Mobile 2- WIP – South: awaiting network connectivity
Tele-Health: Jordan

Clinical Collaboration

- Clinician-to-Clinician collaboration radiology pilot within the Royal Medical Services
  - Audio/Video Conferencing Solution
  - Image Transfer (network and Security) Solutions
  - PACS capabilities to view, share and image reporting
  - Up to 3/2014: 5138 images transfer and 2426 virtual collaboration cases
Tele-Health: Jordan Project - Key Components

1. Support Activation
   - Plan, Design, Ordering, shipping & clearance of CHP equipment
   - Connectivity setup & testing at PHH, Data Center (DC at MoH) & MPH
   - Implementation
   - Go Live

2. Support Activation
   - Monitoring
   - Clinical Value Evaluation

3. Adoption
### TeleHealth: Jordan - Example - Forms Created & Customized for Pilot

#### Surveys

- **Appointment Card**
- **Specialist**
- **Patient-side Doctor**
- **Patient**

#### Metrics Collected

<table>
<thead>
<tr>
<th>Metric</th>
<th>Measured as:</th>
<th>Measured by:</th>
<th>Document:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation Outcomes</td>
<td>Patient disposition:</td>
<td></td>
<td>CHP Consult Report</td>
</tr>
<tr>
<td></td>
<td>Additional diagnostics ordered locally</td>
<td>Check boxes</td>
<td>PHH Physician Survey</td>
</tr>
<tr>
<td></td>
<td>Treatment provided locally</td>
<td>Likert scale</td>
<td>PHH Clinic Log</td>
</tr>
<tr>
<td></td>
<td>Management to continue locally</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Admitted to local hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Referred for OP diagnostics</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Referred for treatment or management</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Referred for procedure</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Referred for hospitalization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definitive diagnosis established</td>
<td>Treatment plan established or changed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Acceptance</td>
<td>Patient appears comfortable</td>
<td>Yes/No</td>
<td>CHP Consult Report</td>
</tr>
<tr>
<td></td>
<td>Refusal to consent</td>
<td>Yes/No</td>
<td>Patient Survey</td>
</tr>
<tr>
<td></td>
<td>Appointment no-show</td>
<td>Yes/No</td>
<td>MPH Physician Survey</td>
</tr>
<tr>
<td></td>
<td>Extent to which concerns are addressed</td>
<td>Likert scale</td>
<td>PHH Clinic Log</td>
</tr>
<tr>
<td></td>
<td>Perceptions of quality of communication between doctors</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference for in-person consultation</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subsequent participation</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall satisfaction</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External perception of satisfaction</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td>Consulting Physician Acceptance</td>
<td>Ability to communicate recommendations</td>
<td>Likert scale</td>
<td>PHH Physician Survey</td>
</tr>
<tr>
<td></td>
<td>Treatment plan established or changed</td>
<td>Likert scale</td>
<td>PHH Clinic Log</td>
</tr>
<tr>
<td></td>
<td>Definitive diagnosis established</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Preference for in-person consultation</td>
<td>Yes/No</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Follow up CHP consult requested</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td>Requesting Physician Acceptance</td>
<td>Quality of communication with consultant</td>
<td>Likert scale</td>
<td>MPH Physician Survey</td>
</tr>
<tr>
<td></td>
<td>Ability to address patient concerns</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Received information that will help in future</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Perception of patient satisfaction</td>
<td>Likert scale</td>
<td></td>
</tr>
<tr>
<td>Patient Convenience</td>
<td>Time saved at work or school, patient</td>
<td>Fill-in</td>
<td>MPH Patient Survey</td>
</tr>
<tr>
<td></td>
<td>Time saved at work or school, companions</td>
<td>Fill-in</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alternatives to CHP:</td>
<td>Check boxes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Drive to Amman</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Had someone else drive to Amman</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taxi, bus, other transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gone to local doctor only</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not gone to doctor at all</td>
<td></td>
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</table>
Current Project Under Execution

- MoH Service Exchange Platform (SXP)

- Al Bashir Hospital
  - Radiologists, Specialists, Modalities

- Al Mafraq Hospital
  - Radiologists, Specialists, Modalities

- Queen Rania Hospital
  - Radiologists, Specialists, Modalities

Data Center at the MOH

- Merge PACS System
- RIS in Arabic
- 40 TB Archive

Cisco Service Exchange Platform

- Secure User Environment
- Access to PACS applications
- Access to Studies, Patient Information

Remote Viewing & Collaboration

- On-line Consults
- Training
- Record/Playback Studies
Electronic Health Solutions
Transforming Healthcare in Jordan

EHS Programs
EHS is a private non-profit company funded by the government for serving public sector healthcare projects.

**Our Vision**

“To transform and sustain a continuously improving healthcare system in Jordan by leveraging technology”

**Our Stakeholders**
Electronic Health Solutions

- Implementing Electronic Health Records offering single record per patient country wide
- Electronic medical library that provides Healthcare workers in Jordan with electronic up to date, evidence-based medical journal
- Provides education in the health sector, individuals and university students to increase the knowledge of health informatics in Jordan.
Hakeem program represents the first initiative of the company for computerizing of the Kingdom’s public health sector.

Hakeem program aims to deploy EHR in Jordan’s’ public health sector civil and military Hospitals and clinics.
VistA EHR

Hakeem program is being implemented based on the Veterans Association platform “VistA” which is a system used throughout the United States Department of Veterans Affairs (VA) medical system.

EHS customized VistA system to the local health sector needs and requirements for the use of the system in Jordan.

VistA offers a proven Open Source, enterprise-wide, fully integrated, fully functional scalable information system built around an Electronic Health Record (EHR).
Many countries have trusted VistA System to deploy EHR. Jordan is one of those countries.
**Improving Healthcare Services**

- **Improved Diagnosis and Reduction in Medical Errors Through Patients Records**
- **Continuity of Care**
- **Improve Patient Safety** (BCMA, Drug-Drug Interaction, Allergies Alerts)
- **Integrate Preventive Health Care Tools** (Clinical Reminders)
A positive **patient experience** in hospitals and clinics.

**Hakeem Benefits**

- **Optimization of Facility Workflow**
  - (Paperless Documentation)

- **Minimization of Patient’s Waiting Time**
  - (Queuing and Appointment Systems)

- **Enabling Regional Referral Centers**
Reduce **operating costs** of health care facilities

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**Improving Resources Utilization**

(Archiving Patient Records and X-ray Images)

**Controlling Waste & Duplication**

(Eliminating Duplication in Dispensing Drugs + Repeat of Lab Tests)
Supporting Research and Decision Making

- Comprehensive Database of Patients.
- Support the Decision-Making process, by Providing Necessary and Periodic Statistics
- Develop Necessary Policies for the Advancement of Healthcare in Jordan
- Provide the Latest References and Research.
Standard Scope of Implementation in a Hospital

- **Patient Information Management System Registration & Scheduling (PIMS)**
- **Surgery Package**
- **Emergency Department Integration Software (EDIS)**
- **Laboratory Package**
- **Radiology Package**
- **VistA Imaging**
- **Pharmacy Package**
- **Vitals/Measurements**
- **Bar Code Medication Administration (BCMA)**
- **Computerized Patient Records System (CPRS)**
- **Patient Billing and Inventory System**

**What is implemented inside Hakeem Sites**

- Installation of computers, servers and networks
- Implementing the VistA system to computerize health records
- Full Training for facility staff
- Installing Computerized Patient Record System (CPRS)
- Patient Billing and Inventory Systems
Scope of Hakeem Implementation

- Central Supply Directorate
- Private Sector Services
- Civil Insurance

Health Care Exchange

Master Patient Index (MPI)

Health Info Dashboard

- MOH
- RMS
- University Hospitals
- KHCC

Extended Patient Services

- Targeted Medical Information
- SMS Notifications
- Web Access and Mobile Application
Hakeem Road Map

- Adding More Medical Features + Packages
- Patient Empowerment Platform (PHR & Targeted Patent Information)
- Public Health Insurance + Central Supply Directorate (Benefits Measurement /Clinical Reminders/ KPI’s)
- Master Patient Index
- Health Informatics and Reporting
- Operational Continuity and Sustainability
- Roll Out of Patient Billing and Inventory Control Systems
- Implementation in 42 Hospitals - 85 Comprehensive Clinics – more than 300 Primary Clinics

Pilot Phase
PHH & ACC
5 Hospitals and 2 Clinics including KHCC

2009 - 2011
2012 - 2013
2014
2015
2016
2017-2018
Achievements to Date and Implementation Plan

2009 – 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-2014</td>
<td>11 Hospitals, 9 Comprehensive Clinic, 31 Primary Clinic</td>
</tr>
<tr>
<td>2015</td>
<td>8 Hospitals, 19 Comprehensive Clinic, 60 Primary Clinic</td>
</tr>
<tr>
<td>2016</td>
<td>9 Hospitals, 20 Comprehensive Clinic, 100 Primary Clinic</td>
</tr>
<tr>
<td>2017</td>
<td>10 Hospitals, 20 Comprehensive Clinic, 90 Primary Clinic</td>
</tr>
<tr>
<td>2018</td>
<td>8 Hospitals, 20 Comprehensive Clinic, 100 Primary Clinic</td>
</tr>
</tbody>
</table>
A study was conducted by the USTDA and financed by the USAID to assess the impact of implementing EHR Systems.

The study consisted of 21 indicators which included:

- 9 indicators related to improving healthcare services
- 4 indicators related to operating costs reduction
- 8 indicators related to projects implementation progress
Hakeem Implementation Outcomes

The Value of Saving in Medication Consumption

-24%

Increase in Lab Test Efficiency

56%

The Value of Saving in Radiology Films

-28%

-51%

-26%

(MRI)

(X-ray)

(CT Scan)
Future Telemedicine in Hakeem

• Centers of Excellence:

- Hospital A
- Hospital B
- Hospital C
- Histopathology center
- MRI Unit
Future Telemedicine in Hakeem

• Electronic referrals and scheduling remotely:

Healthcare Facilities — e Referrals — Healthcare Service Providers

Physician — e Scheduling — Patient
Future Telemedicine in Hakeem

• Ambulance (paramedics) connectivity to system and consultation.

• Video Conferencing
Tele – ICU
What is Tele-ICU?

It is a concept of care (used since 2000) in which a centralized or remotely-based critical care team is networked with the local bedside intensive care unit (ICU) team via audiovisual communication and computer systems.
How does Tele-ICU work?

- A tele-ICU uses equipment and specific software to connect ICU patients in rural hospitals to expert ICU staff 24 hours a day, seven days a week, from anywhere in the country – or the world.

- These doctors and nurses, at the centralized location, use remote-control cameras, video conferencing and continuous monitoring technology to access real-time patient information – including vital signs, physiologic data and ventilator settings. They have access to patient records, images and lab data.
Why Tele-ICU?

- The ICU environment continuously assails clinicians with distractions, alarms, and interruptions that produce **alarm fatigue** and the potential for increased error rates. While addressing the needs of 1 patient, a busy nurse or physician may be unaware of a second patient’s change in status that requires immediate attention.

- The tele-ICU is a “**second set of eyes**” that provides additional clinical surveillance and support. By collaborating with the bedside team, the tele-ICU can support care without distraction and deliver timely interventions when minutes may make the difference.
Will it replace local staff?

The purpose of the system is **not to replace** bedside clinicians or bedside care, but to provide:

- Improved safety through **redundancy**
- Enhanced outcomes through **standardization**.


Thank you

Any Questions?