department of internal oversight services

evaluation of the e-health project

Juan Luis Dominguez-Gonzalez
Giorgi Pkhakadze
Malith Gunasekara
Ahmed Abedaljawwad
executive summary

a. The United Nations Reliefs and Work Agency for Palestine Refugees in the Near East (UNRWA) Health Department started developing a comprehensive reform effort in 2009; it included two main components: the establishment of the Family Health Team (FHT) approach and the move to e-Health information system. The overall objective of the e-Health implementation is to improve the health status of Palestine refugees through improved quality and efficiency of UNRWA health care services. The e-Health project should, complemented with the FHT approach, reduce staff workload, improve daily operations (data recording and reporting), improve the quality of data, reduce medical errors, and reduce paperwork. It should also improve the credibility of statistical information (e.g. accuracy, completeness, errors, duplication, etc.) and thereby the quality of evidence-based planning and management and subsequently improve the effectiveness and efficiency of the health centres. As already mentioned in a previous evaluation of the FHT the e-Health system was challenging to implement and as key part its implementation will reflect on the reputation of the Health Department as a whole.

b. This evaluation covers the e-Health project and it was conducted in April and May of 2015 using a multi-sectorial team approach with external experts supported by UNRWA evaluation division staff Department of Internal Oversight Services. Standard evaluation methodology – primary and secondary data information collection, including a satisfaction survey - was utilized.

c. Expectations for the e-Health system were very high, but at this stage where the project is only partially implemented they did not yet materialize as positive and consistent as might be expected from experience in similar settings. This is not because of the system design, which proved to be an extremely adequate software programme for the Health Department purpose, but because of (a) financial constraints; (b) more complex than expected management challenges and (c) the inadequate resources for implementation. The e-Health project showed its intrinsic capacity to respond to changing and emerging health priorities but it was slow in addressing efficiency challenges. The Implementation process encountered serious obstacles and responded in an erratic and not enough streamlined way to achieve the proposed results.

d. The e-Health impact is potentially very positive but to materialize it will require the fast and complete roll out of a consistent version of the e-Health system. Currently, the gains in health centres’ performance obtained by the e-Health rollout are considerable but only a fraction of the potential of the e-Health system fully developed and at its full capacity. UNRWA has still to ensure that once the e-Health system is functioning at its full capacity, its costs can be accommodated. The evaluation team identified some areas where the implementation could be improved with respect to the rollout of the remaining health centres, so that the full potential of the e-Health system can materialize quickly.

e. Below are the key findings and recommendations of the evaluation:

findings

finding 1

The e-Health system is relevant and has great potential, however because of (a) financial constraints; (b) more complex than expected management challenges and (c) the inadequate resources for implementation, it has not yet been rolled out consistently thus limiting its overall benefits to healthcare delivery. With the development of other electronic health information systems further potential for improving the quality of care is possible through exchange of some data, but this has not yet been approached systematically.
finding 2
E-Health is one of 32 e-Systems headquarters Information Services Division is aware of and plans to integrate, although that integration has never gained momentum and overcome the planning phase.

finding 3
E-Health seems to enjoy substantial acceptance with health centres having adopted FHT approach, as the e-Health FHT version appears to have been designed to better meet FHT needs and requirements. Conversely, the e-Health classical model seemed to be the perfect tool for those health centres still not having adopted the FHT approach. Up until April 2015 e-Health – all versions and modules included - had been adopted by 51 per cent of the health centres, 71 health centres out of a total of 137 throughout the five fields.

finding 4
At the time e-Health was designed, health information systems in Jordan Government and West Bank (Palestinian Authority) were in their initial stages of development and therefore not relevant to be used as a reference. Some discussions were held but no systematic integration or sharing of experiences was implemented.

finding 5
Most of the issues faced by the e-Health system were identified as linked to both project management constraints (governance, planning, communication, accountability, reporting) and financial constraints.

finding 6
The Family Health team approach development has been going on much faster than the e-Health project meant to support it, as a part of that same health reform. To what extent e-Health FHT system delays have impinged on FHT approach development is not up to this evaluation to tell, but “Initial efficiency modelling indicated FHT reform can be clearly justified on an efficiency and effectiveness basis and thereby demonstrating value for money”

finding 7
In general, fully implemented e-Health would not only improve the quality of services provided by allowing more quality patient/doctor-nurse time, but also save staff time and office space. It also would significantly reduce running costs by saving on stationary. Estimated annual “savings” would likely be a minimum of US$ 5 million and could well reach up to US$ seven million annually only form stationary. In addition, free space available in each health centre can contribute to additional savings estimated US$ 10-15 million.

finding 8
The e-Health project and FHT together were effective to move the UNRWA health reform forward.

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1 Estimations are that there are more than 100 additional systems throughout the Agency.
3 See table 8
4 See table 9 and 10
finding 9
E-Health seems to be still far from becoming an efficient tool for accurately collecting and recording health centres’ generated data. Too many manual collecting and recording levels are still in-between to avoid inaccuracy data registration, although health centres are systematically producing an overabundance of records.

finding 10
E-Health contribution to UNRWA data gathering has been limited. Chances are that this situation may revert in the near future as FHT versions’ features are sharpened.

finding 11
There is a very limited impact of e-Health into UNRWA’s decision-making processes, as it seems that only a tiny fraction of e-Health produced information does is used for decision-making.

finding 12
E-Health contributes to improvement of health centre performance, but this improvement appears to be just a fraction of what it could be achieved once e-Health reaches its full development.

finding 13
There seems to be enough evidence that the e-Health system positively impact both, on health centre team dynamics and on patients’ perceptions on UNRWA, among a general feeling of fairness brought by the e-Health equity factor.

finding 14
The e-Health project seems to have not sufficiently used basic management tools on system planning, which goes beyond standard procedures of recurring cost estimates. It might affect not only rational forecasts for future system developments, but also jeopardize fund availability to keep the system in place and running.

recommendations

recommendation 1
The Executive Office should ensure that UNRWA systems should be integrated with e-Health in order to share information for operational purposes as well as management decision-making: Refugee Registration and Information System, Enterprise Resource Planning (ERP), Education Management Information System and Results Based Monitoring System (See Annex 02).

recommendation 2
It would be beneficial for the UNRWA (led by the Executive Office) to integrate some of Hakeem features with some e-Health modules, once Hakeem system is reviewed. The e-Health FHT system should provide access to limited authorized medical information to the Hakeem system operational at those hospitals, visited by Palestine refugees and also obtain information from the Hakeem system to update E-Health medical records of those patients.
**recommendation 3**
The Executive Office should ensure that the governance of the E-Health project is clearly defined (see Annex 04).

**recommendation 4**
To improve reporting and use the potential of the E-Health system the Executive Office should ensure:

- One version of e-Health in all fields.
- The e-Health system should have one unified reporting module. Health Centre staff should not transfer data from one format to another. By principle, current standard 39 regular reports (weekly, monthly quarterly, annually, etc.) should be automatically generated as needed by any authorised user.
- Adequate resources to finalize the project in two years.

**recommendation 5**
The Health Department should ensure that information from e-Health is used for decision-making; three main components need to be implemented:

- E-Health reporting tools (information technology component) have to be finalized accordingly to the requirements.
- All tools/guidelines for reporting should be readily available and adequate training should be provided (e-Learning, questions and answers, etc.).
- A regular monitoring and evaluation system to insure quality of data collected has to be established.

**recommendation 6**
Implementation issues reports should be analysed and reported to the senior management so that they are aware of the challenges faced by field offices and health centres as well as for planning of future upgrades and enhancements.

**recommendation 7**
Executive Office and the e-Health steering committee should ensure that Health Department in coordination with Information Services Division develop a plan of action to finalize the project and to address the following:

- Study the “top urgent” requirements and provide solutions
- Study the maternal health records, pharmacy and non-communicable disease modules in detail and prepare enhancement as they have the most number of support issues
- Analyse “other” issues in detail and provide solutions
  - Report issues that could be fixed in a short timeframe and should be undertaken as a priority to improve user satisfaction
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<td>ERP</td>
<td>Enterprise Resource Planning</td>
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<td>FHT</td>
<td>Family Health Team</td>
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<td>GFO</td>
<td>Gaza Field Office</td>
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<td>JFO</td>
<td>Jordan Field Office</td>
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<td>LFO</td>
<td>Lebanon Field Office</td>
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<td>USAid</td>
<td>United States Assistance in Development</td>
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<td>UNRWA</td>
<td>United Nations Relief and Works Agency for Palestine Refugees in the Near East</td>
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introduction

1. The United Nations Relief and Works Agency for Palestine Refugees in the Near East (UNRWA), was established under General Assembly resolution 302 (IV) of 8 December 1949, becoming operational on May 1st 1950. Its mandate is to respond to the needs of Palestine refugees, until a durable and just solution is found to the refugee issue. It is now serving over five million Palestine refugees.

2. The mission of UNRWA is to ‘help Palestine refugees achieve their full potential in human development under the difficult circumstances in which they live’. UNRWA fulfils this mission by providing a variety of essential services within the framework of international standards, to Palestine refugees in the Gaza Strip, Jordan, Lebanon, the Syrian Arab Republic (Syria) and the West Bank. Among United Nations agencies it is unique in delivering services directly to refugees, and as such is similar in character to a public service organisation. UNRWA mandate extends at present to providing education, health, relief and social services, microfinance and emergency assistance to refugees, infrastructure and camp improvement within refugee camps, and refugee protection.

health in UNRWA

3. UNRWA is the main comprehensive primary health care provider for Palestine refugees in the Near East and has implemented the largest humanitarian operation in the region for over 60 years. The Agency’s mandate on health is to protect and promote the health of Palestine refugees registered in the Agency’s five fields of operations. It aims for them to achieve the highest attainable level of health as indicated in the first Human Development Goal, A Long and Healthy Life, of the UNRWA Medium Term Strategy 2016-2021. Under this goal, UNRWA has three strategic objectives: to ensure universal access to quality comprehensive primary health care; to protect and promote family health; and to prevent and control diseases. The service delivery system has achieved some remarkable gains, particularly in maternal and child health and communicable-disease control.

4. UNRWA embarked on a health reform starting 2011, aimed at targeting the growing burden of non-communicable diseases, improving the efficiency and effectiveness of health service delivery, thereby ensuring access and quality of UNRWA health services. The main components of the health reform were the FHT approach and the e-Health project.

5. UNRWA was using a paper-based system to manage the health service provision. The Health Department initiated the e-Health project to bestow the healthcare service with an efficient state-of-the-art tool to streamline the way those services were provided. The Health Department believes that the E-Health project is essential because of its support for the implementation of the Family Health Team (FHT) approach in addition to its role in supporting the Health Department as a whole. The e-Health project in UNRWA has three components: (1) the capacity building package; (2) the e-Health adoption component; and (3) the e-Health system development.

6. The e-Health system development component included the development of processes; requirement analysis, system design, system development, testing and troubleshooting. It was modular at its early stages, with specific modules addressing different aspects of health management. This modular system was progressively taken over by a newer integrated development – the FHT model – designed to meet the FHT approach’s more complex requirements.

7. The capacity-building package included purchasing personal computers,
uninterrupted power supplies, printers, network infrastructure, making Internet connections available, etc., and training staff on usage of computers in general and the e-Health system in particular. It was meant to reflect the change in approach resulting from the health reform by changing the readiness criteria to reflect the shift from a semi-distributed system to a centralized one, with high requirements for connectivity.

8. The e-Health project adoption component included rolling out processes related to the installation of hardware, general help desk support, e-Health support, development of roles and responsibilities on quality management procedures, and e-Health performance monitoring processes.

9. The e-Health project was initiated in the Lebanon Field Office and funded by Denmark. Two UNRWA projects were then defined:
   - E-Health: Phase 1 - Modernization of Lebanon Field health statistical reporting systems and processes and piloting health clinic automation. Code PG009
   - Upgrading UNRWA Telecommunications Infrastructure in Lebanon. Code PG004

10. The PG009 project concluded in October 2009 and resulted in the development and piloting of three modules of a health information system (HIS) that could be accessible once it was rolled out, by 100+ users in all of UNRWA’s Lebanon 29 health centres, using MPLS telecommunication infrastructure operating at 256 kbps. It was an ad-hoc pilot initiative with funds obtained by the Lebanon Field Office. After moving the e-Health project development to Head Quarters in Amman in 2009, a patient record system with embedded workflow was developed to satisfy users’ needs and improve service quality, the consultation process improved with UNRWA’s different internal stakeholders from all departments – a Steering committee was established in June 2014 to involve all internal stakeholders⁶. As a result, the development and support of the classical system stopped with its last version – classical v5.6, still used by many health centres – and the e-Health project concentrated on developing the successive FHT versions. During its first months of existence⁷,⁸ very few people involved in the e-Health had an exact knowledge of it, especially from November 2014, when it stopped its meetings, only to be resumed by June 2015.

11. Two electronic systems belonging to host governments were being developed by the time the e-Health project started its progress: one belonged to the Jordanian Government Ministry of Health (Hakeem) and the other one to the Palestinian Authority in West Bank (AviCenna). Those two systems were included in the evaluation scope because the Palestine refugees are eligible for the health services in that host countries. As well as, during the concept note development, some stakeholders asked why UNRWA did not use one of those systems, especially they are for free.

12. The Hakeem System⁹, the first national initiative in Jordan to computerize the public healthcare sector launched in October 2009, aims to facilitate efficient, high quality healthcare in Jordan through nationwide implementation of an electronic health record solution. Physicians, pharmacists, medical technologists, and other clinicians are able to electronically access medical records of patients within participating health facilities in Jordan simply by entering the patient’s national ID number. The types of electronic medical information clinicians have easy access to include:

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⁶The e-Health Steering Committee involved Health Department, Information Services Division, Planning Dept., and Field Offices' top management
⁷No written evidence was found on the SC meeting minutes
⁸The SC agreed to: a) allocate new staff, b) appoint Information Services Division field focal points, and c) hire a consultant in Amman as needed
⁹Information gathered in discussions with Dr. Zeid Abu Ghosh and his team at the Hakeem National e-Health Program
Evaluation of the e-health project

13. In its strategy to computerize the public healthcare sector in Jordan, Hakeem adopted VistA, an open source enterprise-wide information system used throughout the United States Department of Veterans Affairs (VA). The Hakeem system is now deployed in 11 hospitals, nine comprehensive clinics and 31 primary clinics. Its implementation plan for 2015 includes eight hospitals, 19 comprehensive clinics and 60 primary clinics. There are plans to implement the system in the majority of hospitals by 2018, which includes further 27 hospitals, 60 comprehensive clinics and 290 primary clinics.

14. Hakeem recorded important medical information such as records of drugs obtained, reasons for visits, etc., which is not available to the UNRWA health centres’ doctors, as e-Health FHT has no links whatsoever to Hakeem. Doctors at Jordanian hospitals have neither access to UNRWA’s e-Health medical records when treating Palestine refugees visiting those for secondary medical care – Palestine refugees in Jordan also visit government and military hospitals to obtain medical services.

15. The Palestinian Authority Ministry of Health\(^\text{10}\) is based on a private software product named AviCenna. Its implementation started in 2012 and currently the software is used at eight hospitals, four health directorates – each including a policlinic – and four primary health care centres. The main hospitals are linked with optic cables to a server centralized in Ramallah. It currently manages an estimated one million patient record.

16. The Palestinian Authority owns 13 hospitals and 418 health centres. The project is funded by USAid and it has plans to make the system of compulsory use to every institution, either public or private – Non Government Organizations included – working in West Bank. Gaza has its own independent system at every hospital. The West Bank Health Information Management System started implementation at hospitals and has been piloted for the last six years due to technical issues experienced. The Palestinian Authority Ministry of Health also stated that they are concerned about the sustainability of this system as hardware replacement is needed every four years and also due to the demand for more stable and faster data communication services.

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\(^{10}\text{Meeting with Palestinian Authority Ministry of Health Public Health Committee and Public Health Directorate}\)
theory of change

17. The purpose of UNRWA’s Health Department is to have a substantial impact on the health status of Palestine Refugees so that they can achieve a long and healthy life. The rationale behind the health reform is that improving the quality of healthcare support will enable Palestine refugees to reach their full potential, prevent illness by detecting early warning signs or symptoms before they develop into a disease and detect disease at an earlier, and often more treatable stage.

18. Improvements in health service quality and efficiency require effort to improve the operations and processes of health service delivery. Therefore, the e-Health project should, complemented with the FHT approach, reduce staff workload, improve daily operations (data recording and reporting), quality of data, reduce medical errors, and reduce paperwork. It should also improve the credibility of statistical information (e.g. accuracy, completeness, errors, duplication, etc.) and thereby the quality of evidence-based planning and management and subsequently improve the effectiveness and efficiency of the health centres.

19. The FHT approach requires an efficient and effective data management system to allow a better judgement of health cases. Therefore, the e-Health project is important to the FHT approach implementation, which is considered as a pillar component of the health reform, in addition to supporting the Health Department as a whole to improve the quality and efficiency of healthcare provision. Thus, the e-Health system should meet technical and operational requirements to support the Health Department at headquarters, field offices, area offices, and health centres.

20. The approach of the Health Department is in line with the belief of health system managers worldwide, that the use of electronic systems will provide more accurate information to doctors, in terms of the health status of individuals, treatments, tests, and referrals, to improve the processes, save time, accommodate an increased number of patients, avoid repeated tests, ensure appropriate referrals, improving the quality, safety, and efficiency of primary care practices, improving coordination of care, reduce medical errors, and increase preventive care

purpose of the evaluation

21. UNRWA aims to ensure that all initiatives, especially those of a strategic nature are evaluated independently and
Evaluation of the e-Health Project

transparently. The Department of Internal Oversight Services engaged with the Health Department to discuss how the evaluation of the Health Reform could be best facilitated. The Health Department preferred to have key reform components evaluated at strategic points in time, so that they can adjust the future rollout of the components accordingly, and build a body of evidence that will enable the Department of Internal Oversight Services to finalize the evaluation of the health reform process in 2016.

22. In order to have a better understanding on whether the e-Health project was being able to contribute to meeting the ever-changing priorities and needs of the Palestine refugees within UNRWA’s healthcare services after a few years since it was launched, the Department of Internal Oversight Services opened up a process to better identify the features of that requirement and thus facilitate the conditions for an external overview on how the e-Health project was designed and was put into practice to better respond to those needs. This process materialized; firstly, into a “Background paper” being informed by the Department of Internal Oversight Services “Theory of Change”, where the main guidelines to reach that goal were portrayed. This theory furthers the notion that improvements in health service quality and efficiency require effort to improve the operations and processes of health service delivery. The e-Health project should be ideally placed to optimize the effectiveness and efficiency of the health centres.

Scope of the Evaluation

23. The evaluation has covered all fields of UNRWA operations – the e-Health project was not initially rolled out in the Syrian Arab Republic field office so its lack of current accessibility is not likely to impinge on the evaluation outcomes – and looked at all aspects of the e-Health project including previous stages of development. It has included a sample of health centres that have adopted the e-Health system fully or partially and health centres that still follow the paper-based system. Furthermore, the evaluation has assessed good practices in e-Health systems design and the linkage to other systems used in the region (AviCenna and Hakeem in Occupied Palestinian Territories and Jordan host governments). The evaluation has also included a review of lessons learnt from designing, planning, rollout, implementation and change management processes.

Evaluation Methodology

Sample

24. Sixteen health centres were initially selected from those four remaining geographic areas: Gaza, Jordan, Lebanon and West Bank using the following criteria: those health centres having adopted the e-Health system either on its classical or FHT versions, versus health centres that did not use e-Health. Health centres were also chosen according to (a) their successful or less successful performance in their optimal use of the e-Health system; (b) their location, and (c) the amount of beneficiaries served, so as to have a balanced geographical and population distribution – in Lebanon field office, all health centres had adopted the FHT approach. The selected sample sites also relied on UNRWA’s choices and accessibility. The selected centres are listed in Table 1.
25. Although the evaluation survey sample size continued targeting those 16 health centres originally selected to ensure the survey’s methodological quality – 200 staff and 500 beneficiaries surveyed – the evaluation as a whole expanded its overall assessment up to 22 health centres, as it was eventually understood the benefits drawn from a wider and more diversified approach. As a whole, four health centres were assessed in Lebanon covering a Palestine refugee population of 82,091; also four health centres were assessed in Jordan with a population served of 327,543; five health centres assessed in West Bank covering 102,305 refugees; and nine health centres assessed in Gaza with an overall population of 663,357. Therefore the sample assessed by the evaluation reached 1,175,296 Palestine refugees served by those health centres.

26. The evaluation has reviewed a sizable amount of documentation specifically belonging to the e-Health project plus others issued by UNRWA at large – Medium Term Strategies, Field Implementation Plans, Headquarters Implementation Plans, UNRWA’s Operational Development, etc. (see a list of references in Annexes).

27. The methodology of the present research has included quantitative quasi-experimental study approach, qualitative methods using semi-structured questionnaires, checklists, patient flow circle, semi structured interviews and literature review. All methods were previously piloted in two health centres located in Jordan field office before rollout in all fields (Annex 01):

- Quantitative methods (survey): the evaluation followed a quasi-experimental study approach\(^\text{12}\), to estimate the causal impact of the e-Health project on two stakeholders’ groups: health centre staff users and beneficiaries present in 16 health centres.
- Qualitative methods: included semi-structured questionnaires in an estimated 22 health clinics (four from each field office plus four more in GFO and two more in WBFO).
- At every health centre visited an agreed checklist (see annexes) was used in interviews with Senior Medical Officers, Senior Staff Nurses and in some cases clerks.

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\(^{12}\) *Quasi*Experimental Design* Jung Eun (Jessie) Hong Feb. 23, 2009; QuasiWorkshop WD Crano presentation 2014 Student Copy
28. While the e-Health should ultimately contribute to the long and healthy life of Palestine refugees, the evaluation has limited the analysis of impact to the contribution of e-Health to improved service delivery by the health centres. The evaluation has also included analysis of gender aspects and other crosscutting issues as highlighted by UNRWA along the evaluation process of the e-Health project.

29. UNRWA’s Health Department – field offices included – and Information Services Division were primary stakeholders, and other headquarters’ departments (Human Resources Dept., Finances Dept., Relief and Social Services, External Relations Dept.), health centres’ personnel, UNRWA hosts, Palestine refugees, and e-Health project donors, were secondary stakeholders of the evaluation.

30. The evaluation has looked at other UNRWA information systems in place, such as the education programme and the refugee registration software. It has also tried to address how the e-Health system helps to manage pharmacy supplies at the health centres, in order to bring about possible improvements in their supply chain.

Data analysis
31. Data collected were analysed and grouped following the project logical sequence:
   - Input, processes adopted to convey inputs,
   - Outputs obtained and outcome achieved.
32. This scheme has guided the evaluation data analysis in order to achieve a more coherent interpretation (Annex 01).
33. Quantitative data from the questionnaires were entered using statistical applications.
34. In addition to those 16 health centres visited for the survey purpose, two more health centres were initially visited in Jordan Field in which both quantitative and qualitative methodological tools were tested.
35. The beneficiaries’ survey was conducted to a total of 500 patients (30 patients per health centre) out of the total daily patients in the selected facilities. A total of 480 questionnaires, in addition to five per cent as a quality validation, were collected based on a confidence level of 90 per cent. The selection of patients was based on random choice made by the evaluation (from patients who were coming to the clerk room and before going into the waiting area), exception made of the first two health centres in Lebanon, where the choice was facilitated by the Senior Staff Nurse closely following criteria set by the evaluation. Data for those two clinics were checked against the full results.
36. For the staff survey, a stratified random sample was followed targeting different staff levels (doctors, nurses, pharmacists, laboratory staff, clerks, and other health centre staff) with an average of 50 staff interviews per field office, giving an overall total of 200 staff approached.
37. The field itinerary was developed with UNRWA Department of Internal Oversight Services and Health Department upon arrival in country. These schedules were later adjusted though, depending on several field-specific factors. Any adjustments were discussed with UNRWA’s main office in Amman.
38. The present methodology has followed ethical guidelines of the United Nations Evaluation Group. Ethical and technical aspects have been discussed with UNRWA headquarters. Proper-signed Subject’s consent form has been obligatory for each participant in the study.
39. The evaluation has been guided by the norms and standards developed by the United Nations Evaluation Group (UNEG), and also taking into account the advice of the Organization of Economic Cooperation and Development – Development Assistance Committee – as well as good practices used by other United Nations agencies and other organizations.

limitations

40. This evaluation repeatedly requested the parties involved – namely Health Department, Information Service Division and Finances Department – to provide the costs associated with the development and implementation of the e-Health system as well as the subsequent yearly recurring expenditure. This information could not be provided on time and finally incomplete recurring expenditure information was provided on the day the draft report was due. It should be noted that the e-Health project management was not aware of some of the recurring expenditure items (incurred at Information Services Division) as well as it had not included costs such as software license fees, permanent staff salaries, etc. The evaluation had to repeatedly request these figures as the recurring costs identified were incomplete and even figures provided were doubtful or fragmented. To overcome this limitation the evaluation team estimated the costs not available.

gender and human rights

41. Ideally, a software health programme should be gender neutral, as it theoretically targets diseases and not persons. However, it seems to be a rather widespread mistaken belief that by approaching female-specific issues through maternal and child services and reproductive health features the gender awareness topic is reasonably addressed.

42. UNRWA appears to place gender on the top of its crosscutting/transversal issues and seems to present itself as extremely aware on gender issues – there are at least two evaluation criteria questions directly addressing gender.

43. Gender awareness permeates UNRWA’s Health Programme throughout, to the extent that staff female to male ratio happens to be higher than two in four field offices – Syria exempted (see Figure 2). However, all these achievements notwithstanding, they do not imply that gender was adequately considered when designing the e-Health (Health Information) system. In particular opportunities were lost to assess the role the gender of the nurses and doctors play in treatment and advocacy.

Figure 2: Percentage of female staff working in health centres

44. Electronic systems can contribute to a more dignified and fair service provision. However, there are chances that systems might discriminate.

14 Evaluation survey results
45. Relevance refers to the extent to which the e-Health project and its intended impact are consistent with beneficiary priorities and needs and with donors’ policies. Relevance also considers the extent to which it is aligned with UNRWA strategic plans. It includes the level of responsiveness to changing and emerging health priorities and needs.

**to what extent did the e-health project contribute to improve health service provision to palestine refugees in health centres and overall to the health service provision in the region?**

46. In a previous evaluation of the FHT approach\(^\text{15}\), it was shown that the initiation of the E-Health system in a sample of health centres, regardless of having or not also adopted the FHT approach seemed to have brought significant improvement in the way those health centres operated, optimizing their practices and services, but also creating enormous gaps due, to a large extent, to a defective e-Health system setup and pour infrastructure network. At that time – November 2013 – the progress of e-Health and the extent of the expectations it raised were prone to all kinds of elucidations\(^\text{16}\) but because of its limitations, e-Health was then not contributing to efficiency.

47. Eighteen months on this evaluation has come across similar limitations constraining e-Health’s sound implementation. Many health centres having adopted the e-Health system are still compelled to maintain double records because of system instability and lack of reliability\(^\text{17}\). Duplication ensures data validity when it comes to monthly performance reporting but at the cost of affecting data quality and placing unnecessary overload to staff.

48. Concerning beneficiaries’ priorities being met by e-Health, patients appear to be satisfied with the consultation time, but they still are not that satisfied with the waiting time. The duplication of staff work and using different systems to do the same thing (appointment system) might be responsible for that. Nevertheless, patient satisfaction seems to be higher in those health centres applying the full e-Health version than in those having just adopted a module (Annex 03).

49. From the other side of the e-Health ownership, Information Technology Field Units complained then and continue complaining now for what they perceive as a lack of involvement in the decisions about the e-Health implementation and readiness process taken at headquarter, and the shortages encountered in keeping up with the infrastructure needs it has created. Health centres’ clinical staff – doctors, nurses, midwives – continue expressing dissatisfaction by the lack of sufficient backstopping offered by Field Offices in terms of refresher training and technical support on the multiple problems arising.

50. All constraints notwithstanding, the decision taken by the Health Department to introduce an electronic information system in UNRWA’s Health Programme as a part of the health reform showed an unquestionable relevance. This relevance went beyond old habits and resistances to change to the extent that, even with those multiple and varied e-Health implementation problems, which seem to have been repeating themselves along the years, no UNRWA healthcare staff seems now to be seriously considering the alternative of pulling out of the e-Health (see evaluation survey results in annexes).

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\(^{15}\) Ibid

\(^{16}\) “UNRWA e-Health: Establishing an electronic medical records system for primary health care in resource-limited Palestine refugee clinics in the Near East” W Venter 19_Nov_2011

\(^{17}\) So far only eight health centres in Jordan (33%) are exclusively using e-Health
51. However, the e-Health has not reached yet the degree of consolidation to become a referent in the region’s healthcare provision. As it will be shown below, a complete lack of interaction — let alone integration — with the region’s other electronic systems, namely Hakeem in Jordan and Avicenna in the Palestinian Authority’s West Bank, has hampered UNRWA’s well-deserved degree of acknowledgement and influence in the host Governments’ healthcare delivery.

52. Moreover, UNRWA’s remarkable achievements in healthcare service, because of e-Health, seems not always having gone on par with a fruitful interaction with other healthcare deliverers in the region. Up until 2010 the approach was: “UNRWA is closed in itself, relating to the local Ministry of Health only on technical issues, and not at all with other providers. This has effectively barred the Agency from coordinating service provision for the same beneficiaries with other potential providers, and may have limited its options of securing additional funding”. This is changing but cooperation channels still need to be strengthened.

Finding 1
The e-Health system is relevant and has great potential, however because of (a) financial constraints; (b) more complex than expected management challenges and (c) the inadequate resources for implementation, it has not yet been rolled out consistently thus limiting its overall benefits to healthcare delivery. With the development of other electronic health information systems further potential for improving the quality of care is possible through exchange of some data, but this has not yet been approached systematically.

to what extent the e-health system was integrated into UNRWA information systems, and contributed to change management in UNRWA?

53. The E-Health system did not seem to be well integrated to any other UNRWA’s electronic systems looked at by this evaluation – Refugee Registration and Information System, Education Management Information System, Enterprise Resource Planning (SAP / ERP) or Microfinance. Selected data from Refugee Registration and Information System are regularly and automatically uploaded to e-Health system.

54. UNRWA Information Services Division confirmed that they had integrated some of the finance and human resource functions such as basic staff information, microfinance loan transactions, local and international staff Visa and United Nations Laissez Passer information, staff pay, bar-coded UNRWA assets, security information management, etc. but not with e-Health. Information Services Division had plans to integrate the Human Resource Satellite System to SAP / ERP in the future but a timeline was not defined.

55. SAP / ERP and e-Health FHT (pharmacy module) integration to support supply chain functions was at “idea stage” but had no defined or documented plans or timelines, Information Services Division informed. Once SAP / ERP, Education Management Information System, Microfinance, Results Based Monitoring, etc., will be faultlessly integrated, e-Health information could be shared between departments efficiently, avoiding duplication of efforts and data errors.

56. As UNRWA’s internal systems were not integrated, users at different related departments could not have the faculty to access information online. Nevertheless, ratios and indicators were defined in some of the UNRWA publications and therefore, these figures seem to having been calculated with

__________________________________________________________________________
18 “From Health Reviews to Health Reform”, UNRWA 13 June 2010
19 Refer Annex 1A: Information Services Division applications interfaced with RAMCO (an internal system)
20 Covering several areas not currently covered by the SAP Human Resources module.
21 SAP – UNRWA is currently implementing SAP enterprise software product to manage their operations (refer Annex 1B: New SAP interfaces)
statistics and information obtained from each system\(^\text{22}\).

**finding 2**

E-Health is one of 32 e-Systems headquarters Information Services Division is aware of\(^\text{23}\) and plans to integrate, although that integration has never gained momentum and overcome the planning phase.

**recommendation 1**

The Executive Office should ensure that UNRWA systems should be integrated with e-Health in order to share information for operational purposes as well as management decision-making: Refugee Registration and Information System, Enterprise Resource Planning (ERP), Education Management Information System and Results Based Monitoring System (see Annex 02).

**to what extent did the e-health project adapt to the change of approach resulting from the health reform and in particular the adoption of the fht approach?**

57. Up until April 2015 e-Health – all versions and modules included - had been adopted by 71 health centres out of a total of 137 throughout the five fields\(^\text{24}\); 65 health centres have adopted the full version (15 in Gaza, 15 in the West Bank, eight in Jordan – those implementing a full classical version, pharmacy module (6) excluded – and 27 in Lebanon\(^\text{25}\)); six have adopted some of the modules especially the pharmacy module, in Jordan\(^\text{26}\).

58. The FHT approach implementation seemed to change the way e-Health project development was originally planned and based on the already available e-Health “classical” version, as it had been conceived and developed in Lebanon Field Office from 2007. The new e-Health FHT versions, issuing from the original classical version once it was centralized and further developed in UNRWA Amman headquarters, were designed to strengthen Health Department’s health reform and the new approach adopted by UNRWA. As a result, the development and support of the classical system stopped with its last version – classical v5.6, still used by many health centres – and the E-Health project concentrated on developing the successive FHT versions. From a technical viewpoint all FHT versions were not able to provide full reporting features needed at all levels, FHT v5 included. However, its interface appears to be more adapted to the FHT approach needs. The latest e-Health FHT v.5 is now available and being tested.

59. The rollout of the FHT approach was much faster (98 out of 115 health centres) and having taken much shorter – from 2011 onwards – compared with e-Health implementation (75 out of 115 health centres) – starting in 2009. Implementation of both FHT approach and full e-Health system at the same time would have been more acceptable to the medical staff. Implemented both components or just with a module – for instance, only pharmacy modules in Jordan – e-Health acceptance lost momentum and excitement and therefore the staff did not enthusiastically uphold e-Health implementation. The biggest challenge took place in those health centres where the FHT approach was introduced but was using the full classical e-Health version (GFO, LFO) or partially (JFO). The use of the classical version not adapted to the FHT approach was actually not welcomed by doctors and nurses. Implementation of just the pharmacy module created extra workload for clerks and assistant pharmacists.

60. Conversely, those health centres not having adopted the FHT approach, found in the e-Health classical version an easy-to-learn, user-friendly and reliable system to manage their practices. Observation at all

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\(^{22}\)“2013_harmonised_results_report”

\(^{23}\)Estimations are that there at more than 100 additional systems throughout the Agency.

\(^{24}\)“Health Dept. Annual Report 2014”

\(^{25}\)Nine health centres out of a total 27 decided to postpone the use of one or another e-Health classical version modules and wait until a complete updated version with adequate infrastructure were installed

\(^{26}\)“E-Health and FHT implementation status as of April 2015”
four Field Offices visited confirmed these findings.

**finding 3**

E-Health seems to enjoy substantial acceptance with health centres having adopted FHT approach, as the e-Health FHT version appears to have been designed to better meet FHT needs and requirements. Conversely, the e-Health classical model seemed to be the perfect tool for those health centres still not having adopted the FHT approach. Up until April 2015 e-Health – all versions and modules included - had been adopted by 51 per cent of the health centres, comprehensive clinics and 290 primary clinics.

63. In comparison, by June 2015 UNRWA E-Health had been adopted by 60 health centres out of a total of 137 throughout the five fields (15 in Gaza, 3 in the West Bank, 15 in Jordan, 27 in Lebanon, and none in Syria – in Syria e-Health was not rolled out before the civil war started but very recent attempts by the Health Department to install it there began\(^{27}\)). Out of those UNRWA 137 health centres, 29 have adopted either the full FHT or classical version and 56 have adopted some of the modules – mainly pharmacy and non-communicable diseases. Table 3 shows

<table>
<thead>
<tr>
<th>Health centres</th>
<th>Classical / FHT</th>
<th>Pharmacy</th>
<th>Non-communicable disease</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>West Bank</strong></td>
<td>42</td>
<td>3</td>
<td></td>
<td>3</td>
</tr>
<tr>
<td><strong>Gaza</strong></td>
<td>22</td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td><strong>Jordan</strong></td>
<td>24</td>
<td>9</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td><strong>Lebanon</strong></td>
<td>27</td>
<td>2</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>115</td>
<td>29</td>
<td>31</td>
<td>115</td>
</tr>
</tbody>
</table>

**Table 2: UNRWA health centres which adopted one or another e-Health version**

71 health centres out of a total of 137 throughout the five fields.

**to what extent was information about host governments’ e-health systems taken into account when designing the e-health project?**

61. Two electronic systems belonging to host governments were found meaningful to be assessed by this evaluation: one belonged to the Jordanian Government Ministry of Health (*Hakeem*) and the other to the Palestinian Authority in *West Bank* (*AviCenna*).

62. *Hakeem* system is now deployed in 11 hospitals, nine comprehensive clinics and 31 primary clinics. Its implementation plan for 2015 includes eight hospitals, 19 comprehensive clinics and 60 primary clinics. There are plans to implement the system in the majority of hospitals by 2018, which included a further 27 hospitals, 60

27 Health Department staff travelled to Syria in May 2015 to speed up rollout
thorough management. There might be advantages of integration of clinical information between Hakeem, AviCenna and e-Heath FHT to facilitate Palestine refugees visiting either host governments’ health centres or referral hospitals.

66. Both, during the 2007 start-up design phase of the first UNRWA e-Health system (classical version) in Lebanon and in 2009, when the Lebanon e-Health system was transferred to UNRWA headquarter in Amman, other e-Health systems in the region such as AviCenna and Hakeem were not even in the planning phase. This may help to explain why during UNRWA e-Health System’s design and development, host governments’ e-Health systems were not contemplated as contributing models. However, it seems that UNRWA e-Health project happened to have some initial discussions with the Hakeem team during the e-Health preliminary design stage but the latter was also at initial design and implementation stage at that time. The UNRWA e-Health team did have one meeting with the Palestinian Authority Ministry of Health in coordination with USAid, but this was not followed up.

finding 4

At the time e-Health was designed, health information systems in Jordan Government and West Bank (Palestinian Authority) were in their initial stages of development and therefore not relevant to be used as a reference. Some discussions were held but no systematic integration or sharing of experiences was implemented.

recommendation 2

It would be beneficial for the UNRWA (led by the Executive Office) to integrate some of Hakeem features with some e-Health modules, once Hakeem system is reviewed. The e-Health FHT system should provide access to limited authorized medical information to the Hakeem system operational at those hospitals, visited by Palestine refugees and also obtain information from the Hakeem system to update E-Health medical records of those patients.

was the e-Health project design adequate, in particular were the e-Health project stakeholders consulted adequately; was the intervention logic well developed and was the governance and support to the project adequate?

67. The e-Health project was initiated in Lebanon Field Office in 2009 and funded by Denmark. Consultation with external stakeholders was then not a priority and limited knowledge of E-Health existed among project stakeholders. After moving the project management to headquarter in Amman limited evidence indicated that consultation with all relevant stakeholders was more forthcoming.

68. External experts tested specifications of the e-Health system based on the main code it was written in and confirmed that the code was secure – detailed “language” code was available at the Information Services Division. The UNRWA e-Health system did not use as platform any other “ready-made”29 modules, as for instance Hakeem did in Jordan and the Palestinian Authority with AviCenna in West Bank.

69. No evidence was obtained on the way, requirements where then collected at observation of differences found in those health centres with the classical v5.6 and those without e-Health, it appeared clear that the e-Health system tried to reflect actual working processes, including translating into electronic format paper-based forms30. As a result, many system “windows” were just reflections from the paper forms used before introduction of the e-Health. However, reporting features did not seem to be reflecting health centres’ reporting needs. Technical specifications were not always shared with the medical and

29 It refers to those software systems already previously developed and widely used and tested
30 Verified by examining existing documentation at health centres without e-Health
nursing staff and as a result some parts of the e-Health modules seem to be more focussed on the information technology users rather than the medical users.

70. When developing a system, the general practice is to involve users at “red assessment stage”\(^{31}\) and get the users to define in layman terms (not technical) what they require from the system. It should cover the workflow, inputs, controls, validations, outputs – reports, screen inquiries, etc., and the frequency for data warehousing and backup for future needs as well as management information such as yearly reporting, statistics, etc. It is vital that the medical and nursing staff is involved in this process to ensure that user requirements are met when developing the system. The users should sign off these “user requirements” before Information Services Division starting the system development. It is an established Information Services Division it was outlined that “unfortunately, due to the limited staff and particularly the lack of Information Services Division staff full-time dedicated to the e-Health project, delivery of agreed requirements was delayed”\(^{32}\).

73. Contradictorily, it also appeared in the evaluation survey that a great deal of e-Health users reported having been consulted at the e-Health design phase. In terms of the stakeholders’ involvement, the e-Health project consulted the staff, so almost 60 per cent of them said that someone asked them about their opinion in the e-Health system. This wasn’t the case with the beneficiaries as only less than four per cent stated that they provided a feedback on the system\(^{32}\).

74. Unless mentioned otherwise, data enclosed in tables and graphics below belong to the evaluation survey results (Annex 3).

<table>
<thead>
<tr>
<th>Did anyone ask your opinion</th>
<th>FO Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes N (%) 29 (58.0)</td>
<td>18 (36.0)</td>
<td>34 (65.4)</td>
<td>42 (77.8)</td>
<td>123 (59.7)</td>
<td></td>
</tr>
<tr>
<td>No N (%) 18 (36.0)</td>
<td>24 (48.0)</td>
<td>15 (28.8)</td>
<td>12 (22.2)</td>
<td>69 (33.5)</td>
<td></td>
</tr>
<tr>
<td>N/A N (%) 3 (6.0)</td>
<td>8 (16.0)</td>
<td>3 (5.8)</td>
<td>0 (0)</td>
<td>14 (6.8)</td>
<td></td>
</tr>
<tr>
<td>Total N (%) 50 (100)</td>
<td>50 (100)</td>
<td>52 (100)</td>
<td>54 (100)</td>
<td>206 (100)</td>
<td></td>
</tr>
</tbody>
</table>

**Table 3: Opinion about e-Health system asked to UNRWA health centres’ staff**

71. fact that this was not done, or done in a substandard way, due to the high number of “top urgent”, “new requirements” and other issues reported to the support unit. Many versions of FHT had to be released, too, also due to the same reason.

72. Taking into account that there did not appear to be any documentation available to identify the system’s initial requirements, this evaluation could not assess whether those requirements were delivered. In the FHT versions, requirements were clearly identified and listed by the e-Health project (project documents and technical notes), and the Information Services Division developed these requirements according to the plan. During the meetings taking place among the evaluation, the e-Health project, and

**did the e-Health project take account of the particular needs of female staff?**

75. The question is vague enough to allow all kind of interpretations, and no further information on this concept was forwarded to the evaluation team\(^{33}\). However, if the logical interpretation might be to what extent the e-Health design anticipated gender-specific needs, which would benefit from using e-Health, the system did not seem to consider those particular needs.

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32 It is beyond the scope of this evaluation to assess the reasons behind that apparent lack of beneficiary consultation. It may be fair to believe that sharing the complexities of an electronic HIS to the majority of UNRWA beneficiaries might have proven of no value

33 The question vagueness was raised at the evaluation Steering Committee meeting prior to the inception report (authors’ note)
76. The system could have been steered to be more sensitive and to focus on some of female staff needs, such as having a flexible appointment system during breastfeeding periods, or giving attention to female staff performance at different levels, to enable drawing some useful managerial assumptions.

77. In UNRWA the working conditions and workload is equal for male and female doctors therefore the e-Health system did not anticipate to generate data by sex of the employee. Therefore indicators such as “2.b. Number of consultations per doctor per day”, “2.c. Antibiotic Prescription Rate” or “2.i. Total prescriptions/capita (served)”, are not available by sex of staff. Similarly the e-Health system cannot provide sex disaggregated data on male adherents to family planning services, or changes in family planning services’ attendance when the reference gynaecologist was male or female (such as replacements during sick leave).

Human rights

78. The e-Health system together with the more rigorous scheduling did improve the fairness of service provision as it did provide staff a tool to push back when people requested preferential service.

Reflections on relevance

79. The e-Health system has shown its exceptional relevance vis-à-vis both donors’ objectives for UNRWA’s healthcare network and UNRWA’s strategic plans contained in the Health Reform. Moreover, its capacity to respond to changing and emerging health priorities has been validated below. Once its strengths completely developed, it will also prove its relevance to beneficiary needs.
efficiency

80. Efficiency measures how resources or inputs (budget, staff time, supplies, infrastructure, etc.) are converted into results or outputs. True efficiency occurs when the proposed results are achieved using the least costly resources.

How does the total system cost of e-Health system compare with other relevant systems?

81. The financial implications of UNRWA e-Health system are a challenge and the comparison to other electronic health systems in the region are a challenge even bigger, due to several reasons: firstly, costs of the initial stages of UNRWA e-Health system rollout were hard to assess because of the e-Health system was developed and piloted for each of the versions and for a prolonged period parts of the system have therefore in a "pilot phase". Possibly the lack of available funding has contributed to the slow roll out to all clinics. The development phase was very long due to lack of available funds to test the system. As a consequence of the interrupted financial support the much-extended pilot-phase (from 2009 to 2015) costs will expectedly be much higher than they should have been. In addition, a lack of dedicated fulltime e-Health technical staff from the beginning created challenges to deliver timely and to produce clear costing.

82. The comparison of UNRWA e-Health System to other computerized healthcare systems used in the same environment was discussed at length at an Evaluation Steering Committee Meeting held to introduce the evaluation inception report on May 27th 2015. Argumentation made was that the e-Health system could not easily be compared to any UNRWA internal systems, as the coverage and scope were substantially different. Concerning similar external systems, the two other major electronic host governments’ health systems available for comparison were Hakeem and AviCenna.

83. The Hakeem System could not be compared with UNRWA e-Health as the former has multiple functionality, scope and objectives. The main features of Hakeem are hospital management, whereas e-Health focuses in the health centre and pharmacy management. As a last resort, it was decided to compare e-Health with AviCenna Health Information System. AviCenna too is a hospital management system, being also implemented at some health centres and may not be the right product for comparison purposes. Attempts to obtain budget information from Hakeem were not successful.

<table>
<thead>
<tr>
<th></th>
<th>AviCenna</th>
<th>E-Health classical version</th>
<th>e-Health FHT version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Software</td>
<td>US$ 3 million</td>
<td>US$ 500,000</td>
<td>US$ 2.9 million from the USA, US$ 300,000 from Japan and US$ 360,000 from the Swiss. Health Department has proposed US$ 1 million for 2016 from the USA*</td>
</tr>
<tr>
<td>Hardware</td>
<td>US$ 5 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation</td>
<td>US$ 4 million including year 1 and 2 support</td>
<td>Started with 3 staff through Oct 2009-2010; ended with six staff by 2012</td>
<td>At Information Services Division – 2 permanent and 2 temporary staff. At Health Department – 1 Project Manager and 2 Quality Control officers</td>
</tr>
<tr>
<td>Open License</td>
<td>US$ 1.8 million</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resources</td>
<td>Unknown</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>* Estimated Project Cost up to end of 2016*</td>
<td>US$ 1,030,795 (including 11 per cent PSC) = (US$750,027 for comprehensive support, US$ 280,768 for Jordan specific support)</td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Gross estimates of financial resources incurred by West Bank AviCenna and UNRWA E-Health

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84. Listed below is information on e-Health resources gathered during the evaluation review for general consumption:

implementation been efficient in terms of achieving the timeline, using existing space, coordination, staffing and cost?

86. There has been a considerable delay in the e-Health rollout to the extent that from 2009 through 2014 only 29 health centres (19.6 per cent) out of 138 the e-Health started being first developed in Lebanon and just two health centres became e-Health operational before 2009 – have succeeded in working with a full e-Health package, either the classical or the FHT version, while 56 (40.5 per cent) work with just one classical version module, be it pharmacy or non-communicable disease35 (see table 3). Therefore, more than 61 per cent of all UNRWA health centres have continued working with the traditional paper-based system for the last five years.

87. To what extent a systemic shortage of available funding during the first e-Health rollout years or the challenging e-Health management structure was accountable for, this delay is hard to tell. Shortage of funding meant an associated shortage of staff and a scarcity of equipment and built-up infrastructure. However, this evaluation has also found indication that the e-Health project management did not show sufficient clout to translate the project into clear strategic and operational plans and ensure implementation.

88. The evaluation interviewed UNRWA staff, directly and indirectly involved in the e-Health system at Amman headquarter, field offices – area health staff – and health centre staff. Headquarter Information Services Division and Health Department officers were consulted on e-Health, as well as field office information technology / Information Service Office and e-Health focal points at both Field Office and health centre levels. Recurring themes during the interviews were:

- Lack of Health Department e-Health

35 Non-Communicable Diseases
strategy: project planning (equipment, telecom, training, resources, budget)… five years without a plan!

- Lack of a governance policy: there are gaps in communication tools (fieldwork plans, roadmaps, etc.) and communication lines are faulty: there is no guarantee that an email sent with a request can be answered let alone addressed.

- Suitable governance would have decided to create a working group, Health Department and Information Services Division together – Information Services Division experienced staff shortages but this could have been overcome with the right governance.

- Constraints in being accountable to two different departments at the same time: discrepancies between Information Services Division and Health Department: requirements need to be evaluated and a lack of connection between Health Department and Information Services Division is clearly perceived.

- Lack of disaster recovery / contingency plans: e-Health contingency plan priority definition from Health Department and at what cost.

- Complaints on the Information Services Division support from headquarter: lack of information technology governance. Information technology teams in the fields are not managed by Information Services Division but they depend on the Deputy Field Office director.

- No clear project plan to move from the classical to the FHT centralized / integrated model: a roadmap for moving forward e-Health FHT model is needed (project brief / master doc): master plan is lacking (Field Implementation Plan).

- No formal reporting by information technology focal points in the field: only when requested by the e-Health project manager.

89. Many other challenges raised were related to technical issues such as:

- No integration between Queue system and e-Health, lack of flexibility in the appointment system: non-communicable disease appointments don’t reflect patients’ need for new drug collection, so they do it manually (only the Senior Medical Officer – can give a new appointment) – the classical version does it automatically; comment window is not used; few staff skills in computing…

- Lack of backup development: backup connectivity, data security

- Reporting as the main concern: data quality

- Lack of information about entering features for protection issues (gender based violence, disability, mental-health…).

- LFO has developed a hospitalization module under the area health hospitalization officer supervision: why other fields haven’t adopted it…

- Support team in Field Offices: e-Health project team, information technology, logs… no clear leadership.

90. Gaps in e-Health project communication at different operational levels appeared to be fairly consistent. The lack of a thorough and technically e-Health project communication strategy and operational plan seem to be having affected e-Health communication flow. This weakness was already present in the latest UNRWA Organizational Development, according to a paper analysis conducted in 2011: “Organizational Development lacked a communication strategy and related actions that could have supported Organizational Development’s aim while addressing overall staff expectations. This has led to an increased sensitivity and volatility toward

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36 As data is re-entered rather than using the system to automatically aggregate errors can be introduced undetected. Staff was aware that there are no sufficient resources to maintain a strict data quality control system outside of e-Health.

37 However, this module is unrelated to the e-Health system and the comments came up when staff was not aware of the difference.
Organizational Development related activities...” and later: “…nearly all best practices and leading research stress the need for sophisticated, comprehensive and adaptive communication strategies to support and enable broad organisational change\(^{38}\).

92. An e-Health infrastructure status survey dated June 2014\(^{39}\) provides a detailed plan from all four field offices on the status of available equipment such as generators, computers, UPS, printers, scanners, local area network and wide area network lines and related detailed costs. Based on this information, generators are available where needed and power supply shortages are almost solved in all field offices (for instance, LFO requires 3 generators). With computers, the situation is radically different. All four field offices have only 62 per cent of all computers needed (1,477 out of 2,375). The best equipped is JFO 70 per cent followed by WBFO 67 per cent, and GFO with LFO both have 56 per cent of the needed computers. It has to be highlighted that scattered computer distribution in health centres with and without e-Health creates a situation where many of those in which e-Health is not implemented – according to Health Department information dated March 2015 – already have computers (June 2014 survey) and therefore those 215 computers laying idle in those health centres with no e-Health could complete the computer needs of other field offices.

93. A latest e-Health project roadmap\(^{40}\) indicates that e-Health implementation will be completed by the end of 2016, with a planned budget of US$ 1,548,140 for 2015 and US$ 1,938,690 for 2016\(^{41}\). Budget seems to reflect proposed action plan. At the time of the evaluation additional contributions for 2016 were not yet committed.

finding 5
Most of the issues faced by the e-Health system were identified as linked to both project management constraints (governance, planning, communication, accountability, reporting) and financial constraints.

recommendation 3
The Executive Office should ensure that the governance of the e-Health project is clearly defined (see Annex 04).

to what extent has the e-health project revision process been efficient to reflect the change of approach resulting from the health reform and in particular the adoption of the fht approach?

94. UNRWA e-Health system started before UNRWA moved to the FHT approach and, as a result, development of the e-Health

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\(^{38}\)Evaluation of UNRWA’s Organizational Development, 24_10_2011*

\(^{39}\)e-Health Infrastructure status survey’ dated June 2014; “e-Health and FHT Implementation Status Agency wide”

\(^{40}\)“e-Health Rollout by Quarter-May 2015 - All fields (4) (2)*

\(^{41}\)“e-Health Budget Plan January 2015” provided by Health Department (31 May 2015)
system was conducted in two stages. At the first stage five versions of the classical system were developed. Each version was upgraded from the previous version and no “radical changes” were introduced. While the introduction of the FHT version was a reflection of the UNRWA health reform as it introduced the FHT approach in UNRWA health centres, e-Health FHT system, based on the classical five versions, tried to gradually adopt all components of the Health Reform by incorporating additional elements such as family history, reporting, etc.

95. There were many advantages of moving the classical concept to the FHT centralized system in terms of efficiency, but this process was not managed or planned well and resulted in low user/staff satisfaction levels.

96. The move should have been planned to include all the classical system’s features, functionalities, controls, etc., that all health centres were used to, including new requirements, new reports, analysis, controls, bugs encountered previously already fixed, addressed inefficiencies in workflow, etc., so that users could reap the benefit of this transformation to a centralized FHT. The first FHT version being piloted had many shortcomings and had to be enhanced with many subsequent versions of FHT. The latest FHT version still is short of some of the reporting functions. A Quality Control unit was set up to review user needs so that these could be included in the following version. Information Services Division has a Quality Assurance Unit to validate new software development or enhancements and assure that requested changes, new user requirements, bugs, etc. were addressed before releasing these changes to the health centres. However, in the case of the e-Health system the Quality Assurance has not been able to ensure bugs were addressed before the releases. The FHT versions developed and released are defined below:

- **FHT version 1**: released Feb 2013.
  Enhancement done or reason for the release – piloting at Amman New Camp health centre in Jordan and Aqbat Jaber in WB
- **FHT version 2**: released Aug 2013.
  Enhancement done or reason for the release – bugs fixing to stabilize the piloting
- **FHT version 3**: released Apr 2014.
  Enhancement done or reason for the release – enhancement / bugs fixing
- **FHT version 4**: released Jul 2014.
  Enhancement done or reason for the release – enhancement / bugs fixing
- **FHT version 5**: released – to be rolled out in July 2015.
  Enhancement done or reason for the release – fixing reports generation, many enhancements done and bugs fixed.

97. Health Department defined e-Health features and efficiency gains as FHTv.5–expected functionality, and these should be validated after implementation of the latest FHT version 5 at all health centres (see Annex 05).

98. Health Department seems to have an aggressive implementation plan to rollout e-Health FHT v.5 in July 2015 and new modules by end of 2016. However, these appear to be very challenging targets to achieve as design, development and implementation staff turnover at Information Services Division has been very high and challenges in the project management leadership would further delay the implementation.

99. It was also stated, that the Refugee Registration and Information System and Procurement Inventory Management System
would be integrated with the e-Health system with the implementation of the new SAP / ERP system in the near future (no date) but a roadmap was not available at the time of data collection for reviewing the detail project scope, planned resources, budget or implementation strategy. Stakeholders mentioned that the e-Health system will be somewhat integrated with host governments’ health systems. However, no time frame was available.

efficiency modelling indicated FHT reform can be clearly justified on an efficiency and effectiveness basis and thereby demonstrating value for money.

To what extent does the e-health project contribute to efficiency gains in terms of data collection, use of resources [paper, etc.], and health centre management?

Table 6: Estimated stationary savings per health centre size (pop. served) per field office and total

<table>
<thead>
<tr>
<th></th>
<th>Very low Serving &lt;10,000</th>
<th>Low Serving between 10,000-20,000</th>
<th>High Serving &gt;20,000 ≤80,000</th>
<th>Very high Serving &gt;80,000</th>
<th>Total US$</th>
</tr>
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<tbody>
<tr>
<td>JFO</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>1,470,000</td>
</tr>
<tr>
<td>WBFO</td>
<td>22</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>1,480,000</td>
</tr>
<tr>
<td>LFO</td>
<td>15</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>1,080,000</td>
</tr>
<tr>
<td>GFO</td>
<td>0</td>
<td>4</td>
<td>14</td>
<td>3</td>
<td>1,620,000</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>21</td>
<td>39</td>
<td>7</td>
<td>5,650,000</td>
</tr>
</tbody>
</table>

Total US$ 780,000 1,050,000 3,120,000 700,000 5,650,000

Average amount includes: all stationery, furniture and related costs such as procurement process / staff involved / storage / transportation and depreciation of furniture

- US$ 1,670/month / health centre
- US$ 4,167/month / health centre
- US$ 6,667/month / health centre
- US$ 8,334/month / health centre
- US$ 4,442/month/health centre

Table 6: Estimated stationary savings per health centre size (pop. served) per field office and total

100. Assuming that FHT v5 is adequately reflecting UNRWA FHT approach needs, many issues raised by users from all field offices on classical v6.5 and FHT v4 were not addressed in FHT v5. From users’ perspective there were no significant efficiency gains from classical to the e-Health FHT system. Many changes – and associated with them “new bugs” – created additional burden to the staff on the ground and a lack of adequate feedback system (in some cases to fix minor bug takes six months) negatively reflects on the reputation of the system.

Finding 6

The Family Health team approach development has been going on much faster than the e-Health project meant to support it, as a part of that same health reform. To what extent e-Health FHT system delays have impinged on FHT approach development is not up to this evaluation to tell, but “Initial

101. UNRWA headquarter Health Department has a standard set of 39 reports required to be prepared and submitted by health centres to Area and field offices on weekly, monthly, quarterly and annual basis. Unfortunately, the e-Health system is used only in some health centres to produce pharmacy and laboratory reports, while the remaining 35 reports produced are paper-based. As a result, all reports forwarded to the area, field and headquarter levels are not produced automatically using e-Health. There are plans to produce more reports in the following versions of e-Health; however aggregating these will require all clinics in a field using the same version of e-Health.

102. A fully implemented e-Health system could provide significant savings in different

aspects of health centre management. Stationary savings if moving to a paperless health centre could reach US$ 5,650,000 annually, if all health centres would move to the full e-Health (see Table 7).

103. In addition, the majority of health centres using fully implemented e-Health will have additional spare space by removing personal files and reshaping clerk rooms at a maximum 10-15m², where 2-3 clerks would cover their daily duties successfully. The number of clerks could be reduced by 50 per cent in around 45 health centres from all field offices. Similarly, the pharmacy staff service reduction could be around 30 per cent in 65 health centres (mainly staff involved in reporting). Almost all doorkeepers (around 80 health centres with approximately 120 staff) involved in “file management” could see their job description modified. This could free resources to refocus staffing towards most needed new professional staff such as nurses and doctors, when UNRWA will be confronted with increasing demand, because of the population growth.

104. When asked about the effects of the e-Health on data collection, and those once time-consuming processes such as registering a new patient, searching a medical history, etc., an overwhelming majority of the staff said that searching a record became much faster. This perception extended to the registration process and, although to a slightly lower approval, they considered that the appointment system made patient-flow swifter.

**finding 7**

In general, fully implemented e-Health would not only improve the quality of services provided by allowing more quality patient/doctor-nurse time, but also save staff time and office space. It also would significantly reduce running costs by saving on stationary. Estimated annual “savings” would likely be a minimum of US$ five million and could well reach up to US$ seven million annually only from stationary. In addition, free space available in each health centre can contribute to additional savings estimated US$ 10-15 million.

<table>
<thead>
<tr>
<th>Using e-Health will make…</th>
<th>searching a record</th>
<th>making an appointment</th>
<th>registering new person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Become faster</td>
<td>89.0%</td>
<td>73.5%</td>
<td>76.1%</td>
</tr>
<tr>
<td>Still the same</td>
<td>5.8%</td>
<td>11.0%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Become slower</td>
<td>2.6%</td>
<td>3.2%</td>
<td>9.0%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>2.6%</td>
<td>12.3%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Total</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 7: Estimated space savings per health centre size (pop. served) per field office and total

46 5,970M² also can be converted to US$ based on the latest construction survey available in the region 1 M²=2,500US$. Total estimated amount will be US$ 14,925,000. Please note that depending on the region amount will vary and this amount should be calculated/verified by an construction expert (file:///Users/giorgipkhakadze/Downloads/ICCS_Report__2009_UAS2v.pdf in 2009 Germany, Day Centre Cost per M² is EUR 1,350); (http://www.aecom.com/deployedfiles/Internet/Geographies/Middle%20East/2013%20ME%20Handbook_9%20June%202013%20FINAL%20v%20cover.pdf in 2012 Lebanon, District Hospital cost per M² is US$ 2,700)

47 See table 8
48 See table 9 and 10
reflections on efficiency

107. E-Health efficiency cannot be reasonably bestowed at this stage. There seems to be a sizable amount of pending issues to be adopted by UNRWA if it wants to show its efficiency on the way the e-Health project has been managed. However, this evaluation is meant to be a contribution to this endeavour towards efficiency.

<table>
<thead>
<tr>
<th></th>
<th>Very low (saving 10m²) Serving &lt;10,000</th>
<th>Low (saving 30m²) Serving between 10,000-20,000</th>
<th>High (saving 100m²) Serving &gt;20,000 &lt;80,000</th>
<th>Very high (saving 150m²) Serving &gt;80,000</th>
<th>Total m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>JFO</td>
<td>2</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>1,810</td>
</tr>
<tr>
<td>WBFO</td>
<td>22</td>
<td>8</td>
<td>8</td>
<td>0</td>
<td>1,260</td>
</tr>
<tr>
<td>LFO</td>
<td>15</td>
<td>6</td>
<td>6</td>
<td>0</td>
<td>930</td>
</tr>
<tr>
<td>GFO</td>
<td>0</td>
<td>4</td>
<td>14</td>
<td>3</td>
<td>1,970</td>
</tr>
<tr>
<td>Total</td>
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<td>7</td>
<td>106</td>
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<tr>
<td>Total m²</td>
<td>390</td>
<td>630</td>
<td>3,900</td>
<td>1,050</td>
<td>5,970</td>
</tr>
</tbody>
</table>

Table 9: Size of health centres
108. Effectiveness is a measure of the extent to which the e-Health project delivered planned results. It shows the value of changes and the attributes that helped in achieving this change. Efficiency discussed how inputs are utilized to produce outputs. This section will look at the relationship between inputs and results / outputs to determine the effectiveness of the e-Health project. It will also evaluate to what extent the e-Health project was successfully implemented. This section will build on the discussion under efficiency.

**to what extent has the e-health project been able to support the fht approach to improve the quality and efficiency of health service provided?**

109. UNRWA’s healthcare service delivery based on the FHT approach relies on synchronization of different health actors – doctors, nurses, midwives, pharmacy assistants, lab technicians, clerks, and doorkeepers – to successfully achieve comprehensive healthcare to every potential patient in search of assistance. The e-Health development component, as it has already been highlighted, should have gone on par with the FHT approach implementation. To that goal, the original e-Health classical system was reshaped into a more sophisticated FHT version, in order to meet the increased complexities of the scale the FHT model was posing to UNRWA Health Programme.

110. The challenges and gaps brought by an insufficiently developed e-Health system hampered the FHT model achievements to a certain extent: there still are targets, which have not been reached, as e-Health is not still able to respond to them – data accuracy, reporting profitability to decision-making, adequate contact time, non-communicable disease follow-up appointments… However, as both FHT approach and e-Health are strongly interlinked, achievements are a sum-up of these two health reform pillars.

111. Expansion of and improvements in non-communicable disease services – diabetes mellitus and hypertension secondary programmes – have been correlated with implementation of both e-Health system and FHT approach in the past. The number of patients screened for one or both diseases increased by 91 per cent from 2011 to early 2015 in the West Bank. In the served population aged 40 and above, the prevalence rate of hypertension was registered as just a little over 15 per cent and for Diabetes Mellitus 10.5 per cent in 2014 (see Annex 06).

112. Part of the success of the non-communicable disease program is because of the effective follow-up and tracking made possible by more systematic record keeping, availability of data and a comprehensive approach to treatment. Diabetes Mellitus patient-control is assessed by the defaulting rates, which showed very positive results: 5.3 per cent in 2011 (the first year this parameter was recorded) and 4.8 per cent in 2012, although it reverted to 6.0 per cent in end 2013, to which the continued Syrian conflict and displacement of patients were likely accountable, particularly so in Lebanon 6.8 per cent and Jordan 6.5 per cent, compared to Gaza 4.3 per cent and West Bank 5.8 per cent.

**finding 8**

The e-Health project and FHT together were effective to move the UNRWA health reform forward.

**to what extent has the e-health project achieved its objectives of improving patient compliance, and collected**

49 NCD Report 2012 Ref: Health Department/24/4; Op cit (“UNRWA Health Department. Annual Reports 2013 & 2014”)

50 This rate compares very favourable to default rates in other settings, due to the unique status of UNRWA as well as the lack of alternatives for Palestine refugees

51 Op cit (“UNRWA Health Department. Annual Reports 2013 & 2014”)
comprehensive, accurate and timely information from UNRWA health centres?

113. No health centre has been submitting regular reports by using only e-Health so far. The e-Health system is only able to assist specific centre services (pharmacy, clerk and laboratory) in partially collecting data to be used in the preparation of the standard reporting tools (Excel files).

114. The reporting at the time of data collection was not fully functional, the number of reports was not sufficient and these could not be automatically aggregated. The e-Health project in headquarter Amman is now developing and testing an improved reporting system (FHT v.5) with the help of two consultants but it is still in the draft / pilot mode.

115. In general, all health centres using e-Health mentioned that it is extremely helpful for reviewing the patient’s records and all doctors and nurses having access to the system make wide use of it. However, it has to be remarked that “younger” doctors and nurses (below 45 years old) are more active in using the system than senior staff, having limited appetite in going beyond required “windows”. System “instability”, “hanging” and “errors” are issues among others, mentioned by the staff as the reason why they constrain themselves to search additional information beyond essential “windows”.

116. Patient compliance with the appointment system did sadly enough not happen to be one of the variables registered in the evaluation survey, although it was indirectly reflected in the reactions patients showed with the appointment system in place. Differences in the way non e-Health appointment system was complied with by the beneficiaries compared to the e-Health one, were found. However, the evaluation found that patients were more satisfied with the e-Health appointment system as it was deemed fairer and more egalitarian.

117. The current documentation of the e-Health FHT system provided by Information Services Division\(^52\) was reviewed. These documents should be re-developed using accepted information technology documentation standards\(^53\). It also needs to be remarked that these documents have not been updated for a while.

118. The outstanding issues list\(^54\) of the e-Health system was discussed with Information Services Division and Health Department staff. The reported list of issues was summarised in the following manner:

- Before Sep. 2014: from item number 1 to 617 (617 issues)
- Sep. & Oct. 2014: from item number 618 to 652 (34 issues)
- Nov. & Dec. 2014: from item number 653 to 730 (77 issues)
- Jan. to Mar. 2015: from item number 731 to 749 (18 issues)

119. The evaluation survey items eight and nine deal with the percentage of staff trained on e-Health and staff with basic computer training. It was rated as 63.2 per cent and 61.3 per cent. These ratings should be in the region of 75 per cent to make the best use of the e-Health system.

**finding 9**

E-Health seems to be still far from becoming an efficient tool for accurately collecting and recording health centres’ generated data. Too many manual collecting and recording levels are still in-between to avoid inaccuracy data registration, although health centres are systematically producing an overabundance of records.

**how has the e-health project contributed to how UNRWA gathers**

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\(^{52}\) Refer Annexes: Business Case, Operational manual and User requirement document

\(^{53}\) IT standards should be chosen and decided by UNRWA (ISO, IEEE, etc.). Information Services Division did not use any of these standards for e-Health documentation. Which standards are suitable cannot be suggested unless a detail study was undertaken and an overall view of all IT projects/systems be reviewed. It should be a “standard” for UNRWA and not just e-Health.

\(^{54}\) Refer Annex: e-Health Full Issues List
120. As the e-Health System is not integrated to other UNRWA systems, inefficiencies are being encountered by other departments requiring e-Health system data. They may have to obtain needed information directly from health centres or field offices and manually tabulate required statistics. The current plan to complete the implementation of a centralized FHT system would facilitate data requirements from one only source. Even though Health Department confirmed that plans were in the pipeline to develop integration between systems or departments to facilitate this process or to develop a Management Information System that could provide consolidated information55, this evaluation did not find any mention about it in the documentation handed over so far.

121. There have been several lists of e-Health project design flaws as registered by users to which this evaluation had access. In 2015 the e-Health project drafted an e-Health manual for users but it was not distributed and still was under revision.

122. All 39 paper-based reports regularly prepared by health centres not using e-Health showed errors varying from five per cent to 20 per cent while reports prepared by those health centres with e-Health (17) had 0 per cent to five per cent errors56. It is admitted that reports prepared by e-Health should have no errors. For the preparation of paper-based reports, several persons are involved in data collection, verification, and moving data to different paper-based formats. Conversely, the e-Health system predefines data entry and limits human errors making data almost error-free.

123. To understand errors within the reporting system, the evaluation developed structured checklists for health centres’ medical officers, senior medical officers, and senior staff nurses. These checklists covered all the 39 standard UNRWA reports submitted on weekly, monthly, quarterly or annual basis.

124. Unfortunately e-Health has not adequately been able to contribute to data collection improvement. A main drawback is that there is not a single field office with a standardized data collection system. At the moment field offices are managing health centres with:

- No e-Health.
- Partial e-Health (mainly pharmacy module).
- Classical e-Health based on local (health centre) server.
- Classical e-Health based on a server placed in the field office (Gaza)
- FHT v4 connected to Amman server.
- FHT v4 connected to a local server.
- FHT v5 pilot.

125. As a result of these multiple collecting models in place, data collection and reporting still relies to a significant degree on paper and Excel files. Regrettably, in many health centres, e-Health has created unnecessary and cumbersome reporting requirements, particularly so in those centres with just some e-Health modules (mainly pharmacy), where staff is collecting data parallel in Excel files and the e-Health system. In many centres where e-Health was fully implemented (both classical and FHT versions) clerk, pharmacy and laboratory reporting was directly managed by the e-Health system but still, those reports had to be transferred to “Excel” files and submitted as per standard UNRWA reporting system.

finding 10

E-Health contribution to UNRWA data gathering has been limited. Chances are that this situation may revert in the near future as FHT versions’ features are sharpened.

recommendation 4
To improve reporting and use the potential of the E-Health system the Executive Office should ensure:

- One version of e-Health in all fields.
- The e-Health system should have one unified reporting module. Health Centre staff should not transfer data from one format to another. By principle, current standard 39 regular reports (weekly, monthly quarterly, annually, etc.) should be automatically generated as needed by any authorised user.
- Adequate resources to finalize the project in two years.

**reflections on effectiveness**

126. UNRWA has been slow and timid in the way expected results were delivered. It appears UNRWA did not use available inputs in producing the best possible outputs. Implementation seems to have been erratic and not enough streamlined to achieve the proposed results. Effectiveness has suffered from the UNRWA approach to the e-Health development.
127. Impact measures change positive and negative, primary and secondary long-term effects brought about by adopting the e-Health project, directly or indirectly, intended or unintended. The different levels of results and especially some of the indicators for higher-level results were already discussed in the efficiency section.

**impact**

128. According to top management in some field offices it is “debatable whether e-Health produces information for the management. UNRWA has presently got around 140 different systems running, which also leads to a question about the ownership of those different databases”57.

129. As mentioned under effectiveness the data collection system is not yet standardized. Consequently, e-Health is not used systematically to generate data for decision-making processes in UNRWA at all levels. The system appears to show a strong potential to be an appropriate and timely tool to be used by decision makers at every UNRWA level.

**finding 11**

There is a very limited impact of e-Health into UNRWA’s decision-making processes, as it seems that only a tiny fraction of e-Health produced information does is used for decision-making.

**recommendation 5**

The health Department should ensure that information from e-Health is used for decision-making; three main components need to be implemented:

- E-Health reporting tools (information technology component) have to be finalized according to the requirements.
- All tools/guidelines for reporting should be readily available and adequate training should be provided (e-Learning, questions and answers, etc.).
- A regular monitoring and evaluation system to insure quality of data collected has to be established.

**does the e-health project improve the performance of the work in health centres?**

130. To answer this question the evaluation proposed a series of indicators to assess how e-Health improved working performance in the health centres.

131. Time required and errors recorded at the FHT health centres with e-Health system to:

- **Get personal health record (search)** – if the system is operational and there are no internet/network constraints, it takes just a few seconds to draw it on the screen – no errors are reported, except when the system is “hanged”.
- **Create individual profile** – for the first-time patient it takes up to 15 minutes – no errors reported, except when the system is “hanged”.
- **Create appointment** – creation of appointment is done by the system and takes around 10 seconds – no errors reported, except when then system in “hanged”.
- **Number of patients managed by e-Health queue system** – it manages in fractions of 50 patients. No limitations were recorded so far by any users.

132. Time required and errors recorded at the FHT health centres without e-Health system to:

- **Get personal health record (search)** –
from five to ten minutes – errors related to missing files.

- **Create individual profile** – around 20 minutes – errors associated with handwriting.
- **Create appointment** – around five minutes – errors associated with availability of doctor.

133. Number of patients managed by manual queue system:

- No limitation in the paper-based system. All patients visiting the health centre will get services.

**Patient flow**

134. To understand the patient flow and the time required for a patient to get service in each specific unit such as registration (clerk service), nurse station, laboratory service, doctor service and pharmacy service at an UNRWA health centres, the evaluation developed and applied a standard "Patient flow rollout map checklist" (see Annex 07). This checklist was used in all 22 Health Centres visited by the Evaluation Team. The checklist was built based on the predefined case scenario: "Male Patient: 40 years old, 170cm, 98kg, pain in chest (probably CVD, diabetes), smoker, driver, second time visited the Health Clinic". The time period for the case scenario was selected from "8:00AM to 11:00AM", due to the rush hour (7:30-11:45AM) for almost all health centre visited (office hours usually in all health centre from 7:30 to 15:00).

**Finding 12**

E-Health contributes to improvement of health centre performance, but this improvement appears to be just a fraction of what it could be achieved once e-Health reaches its full development.

**To what extent is e-Health contributing to overall health service provision in the host countries?**

135. Unfortunately, the UNRWA e-Health system did not seem to be designed to exchange data with other systems from the beginning, host Governments’ health data and statistics included. In recent years, host Governments actively developed their own national HIMS and started focusing on data exchange possibilities. For instance, the Palestinian Authority is planning to make it compulsory for all institutions and Non-Government Organizations working in West Bank, to adopt the Avicenna system to enable the Palestinian Authority Ministry of Health exchanging health data from all health facilities under the Palestinian Authority control from 2016. After the completion of the instalment of Hakeem in Jordan by the end of 2017, this may be the case as well. It is therefore crucial for UNRWA e-Health to start exploring data exchange possibilities and also to take into account legal aspects of that data exchange.

136. In a 2009 Health Department assessment, the issue about UNRWA data exchange with host governments was already raised: “Clarity is needed before starting discussing ways to integrate the HP into host health systems. Host health authorities and refugees alike might interpret proposals in this sense as attempts at handing over to host countries the responsibilities of UNRWA towards its target population.”

**To what extent are data disaggregated and the information prepared to provide a better understanding of gender and other crosscutting issues?**

137. Data sex-disaggregation, including health facility utilization trend, was achieved by the Health Programme at the end of 2013. The e-Health system in place offers the possibility of gender-disaggregated data in almost all standardized health centres’ records. To have the full benefit from the data generated it will be necessary to systematically analyse the data generated.

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58 Discussion taken place between Health Department Dr. Ali Khader and the evaluation team on May 21st 2015

59 “Assessment of UNRWA Health Programme E Pavignani 2009”
This will also enhance the understanding of gender issues.  

138. The e-Health system cannot be attributable to gaps occurring in the way the Health Department deals with data. Firstly, because no data produced by e-Health and translated into the monthly or quarterly reports, leave the health centre and arrive at the Health Department unscathed, as those data have gone through a series of manual procedure, so accuracy has been hurt on the way. Secondly, because the system is able to gender-disaggregate almost all available records collected by the Health Department, but once there, disaggregation seems to be constrained.

139. For instance, neither in the latest health reform progress report dated April 2015, nor in the “2014 annual health report” key performance indicators were disaggregated by gender, with the exception of “1.a. per cent of patients with controlled diabetes out of all diagnosed patients with diabetes” in the former, where a gender separation was done to show the number of persons screened outside UNRWA clinics.

140. For instance, neither in the latest health reform progress report dated April 2015, nor in the “2014 annual health report” key performance indicators were disaggregated by gender, with the exception of “1.a. per cent of patients with controlled diabetes out of all diagnosed patients with diabetes” in the former, where a gender separation was done to show the number of persons screened outside UNRWA clinics.

141. The same applied to other indicators such as “2.d. Number of hospitalisations” – even though the field offices sent disaggregated Excel spread sheets to Health Department - or “2.e. Percentage of diabetes patients coming to health centres regularly” where an analysis of the proportion male / female would have helped to better understand trends.

142. Some gaps can be attributed to the Health Department needs to improve its data analysis. For instance, when looking at the “2014 Annual Health Report” disaggregation can be seen in just one of the FIPs indicators: “per cent 4th grade school children identified with vision defect”. Neither in the indicator on “No. continuing family planning acceptors”, nor in those related to non-communicable diseases gender disaggregation was reported.

143. “No. consultations by medical officer” was disaggregated, as were “No. of hospitalisations”, but not analysed or, at least, this evaluation did not find written evidence of it being done. Furthermore, deaths occurring among non-communicable disease patients along a specific year and from which morbidity they died – hypertension and / or diabetes – were not disaggregated either and thus not analysed.

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Table 8: Availability of gender disaggregated data

<table>
<thead>
<tr>
<th>GENDER DISAGGREGATED DATA</th>
<th>GENDER NON-DISAGGREGATED DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outpatient consultations medical officer</td>
<td>Ward distribution of hospital admissions</td>
</tr>
<tr>
<td>Hospitalized patients</td>
<td>Physical rehabilitation</td>
</tr>
<tr>
<td>Dental screening &amp; curative consultations</td>
<td>Family planning users</td>
</tr>
<tr>
<td>School health: vision screening</td>
<td>Postnatal care</td>
</tr>
<tr>
<td></td>
<td>Children under five years old</td>
</tr>
<tr>
<td></td>
<td>Immunization coverage</td>
</tr>
<tr>
<td></td>
<td>Growth monitoring and nutritional surveillance</td>
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<td>non-communicable disease patients registered with UNRWA</td>
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<td>Prevalence of hypertension and diabetes</td>
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<td>Lifestyle management</td>
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<td>Risk status</td>
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<td>Late complications among non-communicable disease patients</td>
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<td>non-communicable disease defaulters and fatality rates</td>
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<td>Communicable diseases</td>
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<td>Laboratory services</td>
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<td>X-Rays services</td>
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<td></td>
<td>Prevalence of anaemia among children ≤ 3yrs</td>
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<td></td>
<td>Prevalence of anaemia among school children</td>
</tr>
</tbody>
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60 For references see “2014 Health Reform Report v04 (7 April 2015)”; “Annual Health Report 2014”
61 “2014 Health Reform Report v04 (7 April 2015)”
62 “Annual Health Report 2014”
144. Gender-disaggregated indicators to assess non-communicable disease screening rates were introduced in 2012 (Percentage of targeted pop ≥ 40 years screened for diabetes mellitus) and (Percentage of patients with diabetes mellitus under control according to defined criteria), showing that for 2013 records, those found in the latter tripled more than the ones in the former (5.7 per cent / 12.5 per cent male & female in 2012 – 24.8 per cent / 39.3 per cent). There is no way to tell whether those increases were due to the improved e-Health system patient registration or due to the FHT approach in place, as these indicators were not analysed either.

145. On the other hand, e-Health does reflect neither UNRWA’s crosscutting issues such as school health, gender-based sexual violence (GBSV), mental health, disability – a constraint painfully felt by both GFO and WBFO, where psychosocial and disability care are strongly developed. It is planned to include these issues in the e-Health FHT latest version (v.6).

146. Although e-Health does not appear to respond to crosscutting issues as a whole, there seemed to be a correlation between some of these and healthcare accessibility. The proportion of disabled people accessing health centres seemed to be highest in West Bank about nine per cent of the patients were disabled followed by Gaza with 5.6 per cent – while in Lebanon the proportion was of 2.4 per cent. In Jordan, no disabled person was found in any of the four centres visited. The association between the disabled frequentation and the location was statistically significant (P. value 0.003).

147. The proportion of disabled patients systematically attending UNRWA health centres in West Bank and Gaza, and to a lesser extent in Lebanon, legitimately raises the question on e-Health design omission of all these crosscutting issues, all the more when UNRWA seems to attach substantial relevance to them.

148. Almost all health centres with e-Health from the four field offices visited indicated similar positive and negative unintended impact. See below summarized:

149. One of the positive impacts of the e-Health system, probably not so much unintended as beyond expectations, was that it also improved the internal working environment by increasing the trust among health centre staff, likely based on the assumption that each one had a complementary role to play: 30 per cent of the staff interviewed said that the main advantage was a much-improved working environment.

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63 Op cit (“Family Health Team Evaluation Draft report 22 04 2014 body v08”) (page 24)
64 Evaluation survey
### finding 13

There seems to be enough evidence that the e-Health system positively impacts both, on health centre team dynamics and on patients’ perceptions on UNRWA, among a general feeling of fairness brought by the e-Health equity factor.

### reflections on impact

150. There has been an undeniable significant impact brought about by the e-Health implementation, but this impact could and should have been far more remarkable having efficiency been higher. The gains in health centres’ performance obtained by the e-Health rollout were just a tiny amount of those attained, once the system is fully developed and at its full capacity.

<table>
<thead>
<tr>
<th>Positive:</th>
<th>Negative:</th>
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<tbody>
<tr>
<td>The system is protecting and increasing security of medical personnel from “free drug shopping” (JFO)</td>
<td>Frustration among staff during the rush hours due to the low speed of the system.</td>
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<tr>
<td>E-Health is seen, both by beneficiaries and by users, as part of the “modern technology” and increase UNRWA image as a provider of modern services.</td>
<td><em>Updating the system</em> caused loss of data: LFO health centres updated the e-Health system on 1 April 2015 and patient records before the date of the upgrade were inaccessible for some time.</td>
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<tr>
<td>E-Health inspired and improved teamwork spirit: teamwork is required to complete all task smoothly.</td>
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**Table 13: High level impact**
sustainability

151. Sustainability measures the extent to which the benefits of adopting the e-Health project will continue in the longer term. It describes the continuation of [intended or unintended] benefits from a development intervention after major development assistance has been completed and funding has been withdrawn. Assessing sustainability involves evaluating the extent to which relevant social, economic, political, institutional and other conditions are present and, based on that assessment, making projections about the UNRWA capacity, to maintain, manage and ensure results in the future.

Are the recurring costs of the e-health implementation higher than before or lower, and are resources available to run the system in the medium term?

152. Although assessing recurring costs until the rollout to all health centres is completed, is not an easy task, it could reasonably be assumed that savings from moving to the e-Health system may cover most expected recurring costs, and even savings overall might be realistic. However, a detailed analysis should be carried out once the FHT system is fully implemented. Some recurring costs may increase due to implementation of high availability data communication lines, upgrade to main servers to host data centrally, upgrade equipment at health centres to facilitate communication, requirements for online real-time disaster recovery facilities and staff to support these systems.

153. E-Health system costs in comparison with those of previous years would be inadequate, because the scope and pace of the work was different, as they were mainly associated to fund availability but not to actual project needs. Different fulltime/part-time technical staff was hired at both, headquarter and field offices. In addition, a step-by-step approach strategy increased the costs of the “maintenance” of different systems managed by UNRWA – with three versions in two different set ups maintained at the time of the evaluation. To speed up the process and calculate costs required in the medium term, the e-Health project should be restructured under a new approach of “field by field” implementation.

154. After having received the results of a careful assessment being done by UNRWA, this evaluation was in conditions to venture an estimate of the recurring costs, which might be reasonably expected to cover new e-Health developments.

155. The expected equipment (hardware and software) upgrading and maintenance costs\(^\text{65}\), the estimated yearly running costs if UNRWA fully adopted e-Health in all its Health Centres, the online/offline proposal contained in this evaluation report included, would amount to circa 3.4 million US$ (See Annex 09). Whether this yearly amount falls under UNRWA capacity to permanently commit donors, or to ensure UNRWA regular funding backup, a debate needs to be opened.

156. During discussions at JFO, it was mentioned that the classical system data at health centres had no backup. FHT system data are backed up centrally at Information Services Division on a regular basis. JFO requested to lock the main server at the centres but was not apparently approved. For physical security, the main servers and related equipment at health centres could be located in the centre’s manager’s room, so that it will be in an air-conditioned, dust-free environment as well as in a secured area. A well-defined Security Policy to access the FHT and classical systems should be formulated. The security audit should be carried out yearly, as the system stores medical information of millions of people, which is strictly confidential.

\(^{65}\) Information on e-Health running costs estimates was available on August 26th, 2015
157. Overall, e-Health needs a business continuity plan that includes a disaster recovery plan / site. In the short term, all health centres using the classical system should manually backup data and store them at the field office. Once all health centres are moved to the e-Health FHT system the head office data centre could take a backup which they do now. Health centres’ main servers were located in dusty and inappropriate environments and, for that reason, the evaluation deemed necessary for them to be located within the health centre’s senior medical officer office as there would be physical security as well as it will be in a dust free environment.

**Recommendation 6**

Implementation issues reports should be analysed and reported to the senior management so that they are aware of the challenges faced by field offices and health centres as well as for planning of future upgrades and enhancements.

**Are the resources available to maintain the e-health (security, backup, training, support, etc...)?**

158. As costs associated to a project are fundamental tools to ensure proper management, the fact that these costs may not be accounted for or known by both, the e-Health project and stakeholders, it is believed to be a major shortfall in e-Health project implementation. It also severely hampers strategies and planning and also puts activities and resources required at a serious risk. To ensure sustainability all resource requirements implementing e-Health System need to be budgeted for. Plans or budgets were not available for future enhancements (e.g.: data communication) or replacement of hardware or software, which has a direct impact on capital and recurring expenditure. Based on these facts and as an urgent priority, universally standard project management policies should be implemented and a competent team should be entrusted with this responsibility as the current staffs have no knowledge or capacity to perform same.

159. It also is worth outlining that the project management and stakeholders should be aware of the project budgets and recurring expenses. A lack of such monitoring would have cost overruns that would create major risks during implementation, as well as sustainability of the recurring costs, if these were not budgeted for. These are basic principles in Project Management, which have not been adhered to.

160. Annual budget allocated to the maintenance of the e-Health system is not adequate and very limited. For example, a similar system such as Hakeem employs around 300 staff to maintain, sustain, and networking the system in just one country, while UNRWA manages the e-Health system with limited full and part-time staff (less than 10) and in five fields. Resource requirements to support e-Health system needs be reviewed and competent staff has to be employed to manage functions with clearly defined responsibilities and deliverables, and also the staff should be dedicated solely to the e-Health Project. It has to be mentioned that the project needs to have financial means to procure short-term Technical Assistance as needed at the short notice.

161. Every health centre implementing e-Health, trains its users on a regular basis, but due to the lack of e-Health standardisation at field offices, no standard training manual exists and no standard certification mechanism is established to ensure end users. In addition, many field offices employ on a temporary basis daily-paid staff (doctors and nurses), so having standard certification mechanism will also minimise mistakes in the system usage.

162. Discussions were held with Information Services Division, Health Department and JFO staff to ascertain the resource availability to maintain the e-Health System. Findings are listed below.

163. Most staff involved in the design and development of the FHT system has left UNRWA or is in the process of leaving the Information Services Division and moving to
other departments. Staff retention is critical for the continuation of the e-Health System; if not, it could pose major risks and challenges to support and further develop it.

164. Health Department has recently employed a team (a retired doctor and head nurse) to provide quality control services to the FHT. They have been reviewing the functionality, bugs, reporting and new requirements that should be included into FHT based on support issues reported by the users. Setting up a Quality Control unit is a step in the right direction, as it would help to address user support requirements as well as improve the e-Health FHT system.

165. Since the inception of the e-Health implementation, a total of 749 support issues were recorded. The evaluation carried out an analysis of these issues. The following items remain unsolved according to the documentation provided to the evaluation team:

- Non-communicable disease – 37
- Pharmacy – 40
- Child Health Records – 23
- Lab – 22
- Outpatient – 28
- Maternal health records – 83
- Other – 71
- Reports – 18
- New requirements – 62
- Top urgent – 26

166. An estimated 418 issues remain unresolved and this is not an acceptable situation. Twenty-six issues have been listed as top-urgent and 62 issues were listed as new requirements. One of the reasons why user satisfaction at health centres was rated low during the survey was due to this challenge.

167. The appointment system in FHT is working and in the classical version, technical issues are still remaining unsolved due to the concentration of all technical resources to improve FHT v5. In all field offices where e-Health is implemented, the appointment system is considered as a very positive and practical component of e-Health and supported adequate appoints, particularly non-communicable disease patient.

finding 14

The e-Health project seems to have not sufficiently used basic management tools on system planning, which goes beyond standard procedures of recurring cost estimates. It might affect not only rational forecasts for future system developments, but also jeopardize fund availability to keep the system in place and running.

recommendation 7

Executive Office and the e-Health steering committee should ensure that Health Department in coordination with Information Services Division develop a plan of action to finalize the project and to address the following:

- Study the “top urgent” requirements and provide solutions
- Study the maternal health records, pharmacy and non-communicable disease modules in detail and prepare enhancement as they have the most number of support issues
- Analyse “other” issues in detail and provide solutions
- Report issues that could be fixed in a short timeframe and should be undertaken as a priority to improve user satisfaction

168. In the future, all pending support issues should be analyzed and reported to the Director of Health Department, so that the senior management is informed, as well as necessary corrective action could be provided, including necessary resource allocations (see Annex 09)

66 Refer e-Health Full Issues List document for details
to what extent is the e-health able to respond to changing and emerging health priorities and needs?

169. The population and its needs are continuing to grow while the resource environment is shrinking. In the context of the former, the epidemiology of disease is shifting to non-communicable diseases such as diabetes, hypertension, cardiovascular diseases and cancer as the main causes of mortality and morbidity among Palestine refugees. Behavioural risk factors such as unhealthy diets, physical inactivity and smoking, prevalent among Palestine refugees, adds to the burden of disease. These changes are compounded by the demographic pressure of the refugee population growing by approximately three per cent annually. Funding is not expected to increase at a pace that would cover both, the population growth, as well as inflationary pressures.

170. Out of ten challenges UNRWA Health Department listed at its webpage (http://www.unrwa.org/what-we-do/challenges?program=39, accessed 21 June 2015), the e-Health project is able to provide fully or partially solutions to four emerging health priorities and needs:

- Increased demand and costs for specialized care, particularly for non-communicable diseases, which is an increasing financial burden for Palestine refugees.
- The Palestine refugee population UNRWA serves continues to increase in size and age, leading to a higher risk of non-communicable diseases, increased intensity of health care utilization and a growing demand for cost-intensive secondary, tertiary and long-term care.
- Doctors are still serving as many as 100 patients per day, high numbers that increasingly challenge clinicians in provision of quality healthcare.
- UNRWA has experienced substantial increases in the costs of medicines and hospitalization fees in recent years.

171. However, as it has been shown, both, above and in the previous FHT approach evaluation68, gains obtained from the e-Health system on the way emerging health priorities are addressed by UNRWA’s Health Programme are extremely significant and its contribution to a more effective approach is praiseworthy.

172. Sustainability measures the extent to which the benefits of adopting the e-Health project will continue in the longer term. It describes the continuation of [intended or unintended] benefits from a development intervention after major development assistance has been completed and funding has been withdrawn. Assessing sustainability involves evaluating the extent to which relevant social, economic, political, institutional and other conditions are present and, based on that assessment, making projections about the UNRWA capacity to maintain, manage and ensure results in the future.

reflections on sustainability

173. While some issues still need to be resolved especially on the information technology support side overall it seems possible that the system can support itself if the savings generated by the system are invested to run and maintain the system.

68 Op cit ("Family Health Team Evaluation Draft report 22 04 2014 body v08")
lessons learned

174. It seems to be a plausible assumption that, beyond systematic financial constraints along the years, the e-Health Project could have chosen a less complex approach, which was adopted more recently when UNRWA decided to focus on the development of the FHT e-Health system. This seems to have created not only increasing frustration among the end-users, but also a recurrent feeling of inefficiency among internal stakeholders. The fact that after five years of e-Health development, e-Health is not capable of delivering reliable and accurate data for UNRWA’s decision-making purposes appears to be a deterrent whose negative impact cannot be underestimated. An increasing feeling of “fatigue” among e-Health stakeholders is taking its toll from the huge expectations it created at the beginning.

175. It would seem therefore a must for the e-Health project to shift gear and work on a serious overhaul of the project’s managerial and operational structures, in order to regain those disaffected who have positioned themselves away from e-Health until the system will be completely fixed. For UNRWA, at this stage, it is unthinkable to revert back to the paper-based management.

176. One of the main advantages of implementing the e-Health FHT system is the centralized data management that could be used to design, develop and provide consolidated Management Information to the Operations and Management staff. The migration of all health centres to the FHT e-Health system at the earliest would greatly facilitate this process.
annexes

annex 1: management response

The evaluation should significantly influence the implementation of the Health reform, of which e-health is a core part. The health reform aims at improving the quality of UNRWA’s primary health care (PHC) services based on the family-centred family health team (FHT) approach. E-health is the fundamental tool to provide more client-friendly PHC services, and to monitor and assess the (improvement of) quality of PHC services.

The evaluation provides a comprehensive overview of the implementation of the e-Health system. The evaluation recognizes the added value of the e-health project and its contribution to improve the provision of health care to Palestine refugees in UNRWA’s health centres. It addresses areas where implementation has been successful and identifies specific areas where improvements are necessary. The launch of FHT-oriented e-health has significantly been delayed due to various reasons. The evaluation contributed to assess the causes of such delays, from technical software issues to broader governance issues, and more importantly indicated the actions needed to avoid any further delays.

The concrete recommendations will allow UNRWA to take necessary measures to fully roll out the system and ensure that the e-health project delivers positive results. This process will be undertaken by the e-Health Project Management Unit under the guidance of the e-Health Steering Committee.

key issues:

recommendation 1: agreed

The ICT Governance Steering Group will address relevant issues to incorporate the e-Health system into one integrated overall ICT development plan. The integration process will be gradual and stepwise.

e-health and ERP are expected to be incorporated by end 2016. UNRWA will also consider using e-Health data for management purposes (for the Refugee Registration and Information System, the Education Management Information System, and for the Planning Department, which collects information and data for inter alia planning and budgetary purposes).

recommendation 2: agreed

UNRWA intends to thoroughly look into possible integration of the Hakeem system. The Department of Health will meet with Hakeem end February to discuss cooperation and integration, including concrete plans on the sharing of information on patients referred to Government hospitals.

recommendation 3: agreed

The e-Health Steering Committee is currently drafting a strategy to implement, support, maintain and upgrade the e-Health system. The strategy will form the basis of the Agency’s e-health governance framework. This will be ready by June 2016. UNRWA will take into account recommendations formulated in the evaluation, including proposals related to governance set out in Annex 5 of the Evaluation.

recommendation 4: agreed

A. One version of e-Health will be used in all Fields. It will roll out as planned by mid-2017.

B. The reports are standardized. At present, 29 out of 39 standard reports are automatically generated from e-Health at the Health Centre level. UNRWA will implement one unified reporting module and will aim at automatically generating all regular e-Health reports.
C. UNRWA will continue to actively seek adequate levels of funding by reaching out to potential donors to implement the e-health project. For 2016, UNRWA received US$1 million from the USA. UNRWA requires an additional US$500,000 in 2016 and US$600,000 in 2017. This will cover the needed support on connectivity and information technology needs: for example, UNRWA will need 4 developers to address IT requirements.

**recommendation 5: agreed**

A. The current e-health reporting tools are almost finalized as stated above.

B. The tools and guidelines will be finalised by end of the first quarter of 2016. Once the tools are finalised, guidelines will be issued.

C. A practical and regular monitoring and evaluation system will be put in place. Once the reporting tools are established, the Department of Health will develop Q&A tools by end 2016.

**recommendation 6: agree**

This process is on-going and will continue to be improved. A system is being put in place to ensure that implementation issues are analysed and reported on a regular basis to the senior management. A regular performance report will be submitted to Senior Management every two months. The first report was submitted in early February.

**recommendation 7: agree**

A plan of action to finalise the project is being developed by the e-Health Project Coordinator, under the guidance of the Steering Committee.

A. It will study “top urgent” requirements and provide solutions. One main challenge is the rapid turnover of the experienced IT staff (as highlighted in the report).

B. The Department of Health is looking into support issues, in particular related to maternal health records, pharmacy and non-communicable disease modules and prepare enhancement. A considerable amount of issues have since been addressed. 103 issues remain to be addressed, out of 418. Of these issues, 42 are either urgent (17) or important (25). Management is addressing these needs, as a matter of priority.

C. The Health Department continues to analyse remaining “other issues” and provide solutions as a matter of priority.

D. The remaining issues which can be addressed in a short time-frame will be addressed as a priority. An updated version of the system will be installed every month to improve user satisfaction.
annex 2: evaluation methodology

Quantitative methods (survey): the evaluation followed a quasi-experimental study approach\(^{69}\), to estimate the causal impact of the e-Health project on two stakeholders’ groups: health centre staff users and beneficiaries present in 16 health centres.

The questions in the survey were guided by the indicators developed based on the assessment criteria questions related to relevance, effectiveness, efficiency, impact and sustainability. The targeted population for the survey was:

- Service delivery (medical staff and non-medical staff) and
- Service users (beneficiaries)

Qualitative methods: included semi-structured questionnaires in an estimated 22 health clinics (4 from each field office plus four more in GFO and two more in WBFO). The evaluation interviewed health centre service delivery personnel: a/management of health centres, b/medical staff, and c/non-medical staff. In addition, a “comprehensive patient flow circle” method was used to identify procedures and time required to register a new patient with a cardiovascular disease – as one of the many options – starting from queue system, registration, making appointment, meeting a doctor, having lab test, receiving drugs and closing the case. This method has allowed the evaluation identifying advantages and disadvantages of paper-based and e-health methods and highlighted bottlenecks in the process. Semi-structured interviews with all primary and secondary stakeholders were also conducted and duly incorporated to the study.

At every health centre visited an agreed checklist (see annexes) was used in interviews with Senior Medical Officers, Senior Staff Nurses and in some cases clerks. After completing checklist’s 1\(^{st}\) and 2\(^{nd}\) parts an additional interview with senior staff nurses provided info regarding reporting and doing patient roll mapping, where the senior medical officer joined in.

Health Centres: The evaluation addressed two groups of stakeholders for data collection:

- **Beneficiaries**: a survey was developed and conducted to obtain the degree of patient satisfaction with the changes perceived in the quality of the healthcare provision after e-Health implementation in the health centres.

- **Health Centre staff**: semi-structured interviews’ topics and survey questionnaires were designed and used with:
  - Service delivery (management staff, medical and non-medical staff)
  - Service users

**UNRWA field offices**: semi-structured interviews were conducted to management direction (Field directors, deputy directors), Programme Direction Health Department, Area medical officers, Programme ICT officers, etc.

**UNRWA headquarters**: semi-structured interviews were also conducted to all relevant informants at every department concerned (Health Department., Information Systems Division., Planning Department., HR Department., Finances Department., Relief and Social Services Department, Department of Internal Oversight Services.

**UNRWA Host Government Ministry of Health (Hakeem & AviCenna systems)**: Purposeful interviews were carried out to ensure relevant issues about systems’ interaction.

\(^{69}\) “Quasi-Experimental Design” Jung Eun (Jessie) Hong Feb. 23, 2009; QuasiWorkshop WD Crano presentation 2014 Student Copy
data analysis

In addition to those 16 health centres visited for the survey purpose, two more health centres were initially visited in Jordan Field in which both quantitative and qualitative methodological tools were tested.

The beneficiaries’ survey was conducted to a total of 500 patients (30 patients per health centre) out of the total daily patients in the selected facilities. A total of 480 questionnaires, in addition to 5% as a quality validation, were collected based on a confidence level of 90%. The selection of patients was based on random choice made by the evaluation (from patients who were coming to the clerk room and before going into the waiting area), exception made of the first two health centres in Lebanon, where the choice was facilitated by the Senior Staff Nurse closely following criteria set by the evaluation. Data for those two clinics were checked against the full results.

For the staff survey, a stratified random sample was followed targeting different staff levels (doctors, nurses, pharmacists, laboratory staff, clerks, and other health centre staff) with an average of 50 staff interviews per field office, giving an overall total of 200 staff approached.

The data collection of both surveys was carried out in the local language of the targeted beneficiaries, with the following quality measurements in place:

- All surveys were reviewed on the spot for any missing data before leaving the site.
- Data was entered on Excel spread sheet TWICE to check the errors or differences.
- Basic data validation and description was implemented to meet another level of quality check.
- The survey analysis was conducted using the Statistical Package for the Social Science (SPSS v17) after naming the variables and classifying the data.
- Basic description, cross tabulation, association and regression were used to find significant relationship between the studied variables following the project indicators. Graphs were established for the significant tables to enrich the contents of the study.

Comparative analysis of the e-Health project developments between the assessment categories, with the aim of identifying key areas for learning (similarities and differences) between the e-health project development and make recommendations in support of transversal improvements or capitalisation, was carried out. Crosscutting issues have tangentially informed every analysis.
annex 3: system recommendations

**Refugee Registration and Information System:** data required by Refugee Registration and Information System such as new-born information, refugees who died, etc., are available at health centres and could be used as management information for planning and budgeting purposes. Refugee Registration and Information System database could also be used to validate the authenticity of any registered refugee so that they could obtain medical facilities at any clinic using e-Health FHT system and refugee data could be accessed.

**SAP:** SAP / ERP (Enterprise Resource Planning) system is being implemented agency-wide to manage and support UNRWA functions. The Inventory control system of the e-Health FHT’s pharmacy module should be integrated with SAP so that updated information could be provided. This would facilitate monitoring and re-ordering of available stocks at pharmacies based on usage and trends, whereby using the supply chain features of SAP. Presently some data are extracted from the Procurement Inventory Management System.

**Education Management Information System:** Education Management Information System should be integrated with e-Health FHT to facilitate sharing of selected information of school children such as medical conditions, special needs, confirmation of absence from school due to medical conditions, medical notices, etc.

**Planning Department:** e-Health FHT could provide statistical information per health centres, per field office, etc., such as actual number of patients per facility, type of drugs used, staff employed, etc., for yearly planning, budgeting and monitoring purposes. A detail study should be undertaken to assess the planning department’s requirements and availability of data before developing the interfaces and designing a MIS.
annex 4: quantitative contribution of e-health evaluation

By Dr. Ahmed Abdelgawad

introduction

UNRWA’s Health Department expressed the wish to have a better understanding on whether the e-Health project was able to contribute to meeting the ever-changing priorities and needs of the Palestine refugees within UNRWA’s healthcare services after a few years since it was launched.

This evaluation should aim at attributing the e-Health project contributions to the achievement of UNRWA’s overall healthcare services (quality and efficiency improvement, and supporting FHT approach). The evaluation is consequently expected to provide advice to the Health Department to improve the e-Health project already being implemented in a number of the health centres (health centres) prior to be rolled out to the remaining ones. It is also expected to identify good practices in relation to the e-Health project.

The evaluation covered all fields of UNRWA operations – exception made of Syria – and looked at all aspects of the e-Health project including previous stages of development. The quantitative aspect of this evaluation included a sample of health centres from 16 locations, in ten cities in Jordan Lebanon Gaza and West bank. A mixture of health centres that have adopted the e-Health system fully or partially and health centres that still follow the paper-based system.

Evaluation criteria were informed in the Background Paper and divided into five main domains: Relevance, Efficiency, Effectiveness, Impact and Sustainability, in addition to the gender aspect. Within those criteria 21 questions were identified and the quantitative arm responded to those assessment questions through two surveys administered with both staff and patients in the 16 health centres.

methodology

The quantitative arm of the evaluation followed a quasi-experimental study approach to estimate the causal impact of the e-Health project on two stakeholders groups: health centre staff users and beneficiaries. It included two surveys: one targeting patients and the other targeting staff of health centres regardless their different roles inside the clinics.

The total number of health centres visited was 16 in addition to other two health centres in which tools were tested. The selection of the health centres was based on specific criteria to include centres applying full E-health, classical version and also paper-based system – (Annex 1).

The patients’ survey was conducted with a total of 500 respondents based on a confidence level of 90% of the total daily patients in the selected clinics (30 patients / clinic) with a total of 480 questionnaires in addition to five per cent as a quality validation.

For the staff survey, a stratified random sample was followed targeting different staff levels (doctors, nurses, pharmacists, laboratory staff, clerks, and others) with an average of 50 staff interviews per field office, with a total amount of 200 staff approached.

The selection of the patients was based on random selection by the evaluator (from patients who were coming to the clerk room and before going into the waiting area). Except for the first two clinics in Lebanon, where the selection was facilitated by the Senior Staff Nurse based on criteria set by the evaluator, data for those two clinics were checked against the full results.

The questions in the survey were guided by the indicators developed based on the assessment questions related to relevance, effectiveness, efficiency, impact and sustainability.

The tools were developed by the quantitative consultant and shared with the evaluation team and the UNRWA focal point for comments and feedback before the field administration and the
surveys were piloted/tested in (Al Tayeb health centre) in Jordan before the actual field implementation.

The data collection of both surveys was done in the local language of the targeted beneficiaries, with the following quality measurements in place:

**quality measurements**

- All surveys were reviewed on the spot for any missing data before leaving the site.
- Data was entered on Excel sheet TWICE as a kind of quality measurement, to check the errors or differences.
- A basic data validation and description was conducted for another level of quality check, before conducting the analysis.
- The analysis was conducted using Statistical Package for the Social Science (SPSS v.17) after naming the variables and classifying the data.

Basic description, cross tabulation, association and regression was conducted to find significant
relationship between the studied variables following the project indicators. Graphs were established for the significant tables to enrich the contents of the study. Gender and accountability were among the crosscutting issues that informed the analysis.

**findings**

**basic description**

The total number of patient surveyed was 500, with 125 per every field, 25 per cent of the total sample (Annex 4 table 1).

The total number of staff surveyed was 200, with 50 per every field, 25 per cent of the total sample (Annex 4 table 2).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
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</thead>
<tbody>
<tr>
<td>Antibiotic prescription rate</td>
<td>24.51%</td>
<td>SD (10.1%)</td>
</tr>
<tr>
<td>Number of visits per-day per-doctor</td>
<td>107</td>
<td>Patients/doctor/day</td>
</tr>
<tr>
<td>Screening, diagnosis and treatment patterns of non-communicable disease</td>
<td>55.60%</td>
<td>Improved diagnosis</td>
</tr>
<tr>
<td>Quality standards for: consultations, maternal and child health, non-communicable disease…</td>
<td>48%</td>
<td>Improved consultation time</td>
</tr>
<tr>
<td>Patient satisfaction on contact</td>
<td>78.10%</td>
<td>Satisfaction rate</td>
</tr>
<tr>
<td>Health centre staff satisfaction with e-Health support to improve healthcare</td>
<td>71.10%</td>
<td>Satisfaction rate</td>
</tr>
<tr>
<td>Patient satisfaction on waiting time</td>
<td>57.40%</td>
<td>Satisfaction rate</td>
</tr>
</tbody>
</table>

Table 3: Indicators Used and Results
(Annex 4 table 2).

The patients’ survey was administered randomly in 16 health centres, and the access of the disabled people to the centres was highest in West Bank compared to the other areas – about 9 per cent of the interviewed patients – while in Jordan no disabled person was found at any of the four health centres visited. The association between the disabled access and the location was statistically significant with (P. value 0.003).

The age of the patients accessing to the clinic was categorized into four groups, with the highest category “25-65 y” 67% of all patients in the clinic, followed by “16-24 y” 19 per cent, elderly “above 65” 11 per cent, and young people “5-15y” three per cent. This is because of the considerable percentage of mothers aged (16-65) that accessed the clinic as a companion for their children. Interestingly both the young people and elderly access to the health centres was highest in Jordan.

Two in every three patients interviewed said that they were visiting the clinic once or more every month, while one in every five stated that they were visiting it almost once every three months.

There is almost no channel to hear the patients’ feedback or opinion, as only four per cent of all patients interviewed said that they provided feedback or comments to the health clinic management.

**gender**

Results showed that the gender factor is powerfully empowered in the four field offices, as the female to male ratio in health centres is more than double. When it comes to gender sensitive issues, mainly with females dealing with medical doctors, there was no problem expected when it came to gynaecologists, and the issue was crucial in clinics inside camps, where some females couldn’t go to such clinics because of their husbands, who knew that there was no female gynaecologist in such clinic.
On the other hand, the male access to the health centres was significantly lower in Gaza clinics, where more than three out of four visitors were females. This might be due to the concept that those clinics are mainly for females and children.

**relevance**

Results showed that the e-Health project contribute to improve health service provision to Palestine refugees in health centres and overall to the health service provision in the region, this was clearly measured through the following indicators assessed,

Patients are satisfied with the consultation time, but they still are not that satisfied with the waiting time; this is due to the duplication of work and to using different systems to do the same thing (appointment system). The patient satisfaction is higher in health centres that apply the full E-health. More detailed indicator-based results are below.

**efficiency**

Results showed that the e-Health project was not standing in the area of efficiency, in terms of the optimal use of the resources with huge efforts needed and time consumed in the area of the reporting. Results showed that staff considering the reporting issue as the main challenges – along with the infrastructure – in applying the e-Health, it was clear that staff is confused about the system they are using, so in almost 85 per cent of all the health centres visited, staff stated different answers when they were asked about the system they are currently using. Additionally, staff training is really needed, as about 80 per cent of the staff interviewed stated that they didn’t get refresher training on e-Health during the last year. Interestingly, when we asked the staff about the latest system malfunctioning, about 58 per cent of the whole health centres stated that the recent system malfunction was just last week.

**effectiveness**

Results showed that the e-Health project was on its way to achieve its objectives of improving patient compliance, and collected comprehensive, accurate and timely information from UNRWA health centres. So results showed that 67.8 per cent of the staff is satisfied with the time required to review the patient’s medical record.

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>field offices</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to read patient history</td>
<td>Lebanon 65.20%</td>
<td>Jordan 65.00%</td>
</tr>
</tbody>
</table>

Table 4: Time to read patient history Staff satisfaction indicator, per FO.

<table>
<thead>
<tr>
<th>Become faster</th>
<th>field offices</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Searching record</td>
<td>Lebanon 38</td>
<td>Jordan 22</td>
</tr>
<tr>
<td>% 92.7%</td>
<td>95.7%</td>
<td>78.4%</td>
</tr>
<tr>
<td>Patients registration</td>
<td>Lebanon 29</td>
<td>Jordan 18</td>
</tr>
<tr>
<td>% 70.7%</td>
<td>78.3%</td>
<td>78.4%</td>
</tr>
<tr>
<td>Scheduling an appointment</td>
<td>Lebanon 33</td>
<td>Jordan 18</td>
</tr>
<tr>
<td>% 80.5%</td>
<td>78.3%</td>
<td>70.3%</td>
</tr>
</tbody>
</table>

Table 5: Impact of e-Health project on patient registration, appointment scheduling and searching activities

**Impact**

Results showed that the e-Health project improved the performance of the work in health centres, in the areas of the patients’ registration, creating an appointment, searching data and
consequently who whole work environment. Results showed that 71.1 per cent of the staff was satisfied with the work organization, saving and searching data on system.

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>field offices</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work organization, saving and searching data on system</td>
<td>Lebanon</td>
<td>Jordan</td>
</tr>
</tbody>
</table>

Table 6: Field of work staff satisfaction indicators, per FO.

For the detailed results on each of those sub indicators, 89 per cent of the staff stated that searching records became faster with E-health, additionally 76 per cent said creating patient profile and registering patient on the system became faster, moreover 73 per cent stated that scheduling an appointment became faster.

**sustainability**

Results showed that the area of sustainability is still not that ready, so in terms of the resources available to maintain the e-Health trainings and system support are not fully well functioning. So on the positive side, more than 90 per cent of all interviewed staff stated that dealing with the e-Health system is an easy process for them and the staff satisfaction rate about the e-Health training is 69.5 per cent. On the other hand, the follow up is not on that level, so over 60 per cent of the staff stated that they didn’t get any refreshment training over the last year, also the support for any system malfunctioning is just when it happens, so three out of each four staff interviewed stated that the technical support team for the system just arrived when the health centre call them because of an existing problem and at this point they shift back to the paper system. So the staff satisfaction on the technical support was about 35 per cent.

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>FO</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainings on E health system</td>
<td>Lebanon</td>
<td>Jordan</td>
</tr>
</tbody>
</table>

Table 7: Staff satisfaction for trainings, per FO.

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>FO</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>System technical support satisfaction</td>
<td>Lebanon</td>
<td>Jordan</td>
</tr>
</tbody>
</table>

Table 8: Staff satisfaction for technical support, per FO.
health centres visited

<table>
<thead>
<tr>
<th>Country</th>
<th>HCsWithout FHT approach</th>
<th>HCsWith FHT approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jordan</td>
<td>El Husn</td>
<td>Amman New Camp</td>
</tr>
<tr>
<td>FHT e-Health</td>
<td>No e-Health</td>
<td>Classically visited</td>
</tr>
<tr>
<td>Classical e-Health</td>
<td>Mushierfeh</td>
<td>Main Baqaa</td>
</tr>
<tr>
<td>No e-Health</td>
<td>HCs without FHT approach</td>
<td>HCs with FHT approach</td>
</tr>
<tr>
<td>Lebanon</td>
<td>HCs without FHT approach</td>
<td>HCs with FHT approach</td>
</tr>
<tr>
<td>FHT e-Health</td>
<td>Classical e-Health</td>
<td>iqlim Kharoub</td>
</tr>
<tr>
<td>No e-Health</td>
<td>El-Buss</td>
<td>Burj Barajneh</td>
</tr>
<tr>
<td>Lebanon</td>
<td>HCs without FHT approach</td>
<td>HCs with FHT approach</td>
</tr>
<tr>
<td>FHT e-Health</td>
<td>Classical e-Health</td>
<td>Saida Polyclinic</td>
</tr>
<tr>
<td>No e-Health</td>
<td>Hebron</td>
<td>N Gaza</td>
</tr>
<tr>
<td>Lebanon</td>
<td>HCs without FHT approach</td>
<td>HCs with FHT approach</td>
</tr>
<tr>
<td>FHT e-Health</td>
<td>Classical e-Health</td>
<td>Iqlim Kharoub</td>
</tr>
<tr>
<td>No e-Health</td>
<td>Hebron</td>
<td>Aqabat Jaber</td>
</tr>
<tr>
<td>Gaza</td>
<td>HCs without FHT approach</td>
<td>HCs with FHT approach</td>
</tr>
</tbody>
</table>

Table 9: Health center visited and type of approach

results based indicators tables

Percentage of patients satisfied with waiting time: 57.4 per cent

<table>
<thead>
<tr>
<th>Patient satisfaction about</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waiting time</td>
<td></td>
<td>59.6%</td>
<td>58.4%</td>
<td>62.4%</td>
<td>49.0%</td>
<td>57.4%</td>
</tr>
</tbody>
</table>

Table 10: Percentage of patients satisfied with waiting time

Percentage of Health Centres patients satisfied with the service that they got it in the health centre: 78.1 per cent

<table>
<thead>
<tr>
<th>Patient satisfaction about</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultation time/service quality</td>
<td>73.8%</td>
<td>79.6%</td>
<td>77.0%</td>
<td>82.0%</td>
<td>78.1%</td>
<td></td>
</tr>
</tbody>
</table>

Table 11: Percentage of Health Centres patients satisfied with the service that they got it in the Health Centre

Percentage patients received health education during the visit: 69.6 per cent

<table>
<thead>
<tr>
<th>Do you get extra medical information during the visit?</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>N (%)</td>
<td>53 (42.4%)</td>
<td>33 (26.4%)</td>
<td>87 (69.6%)</td>
<td>29 (23.2%)</td>
<td>202 (40.4%)</td>
</tr>
<tr>
<td>No</td>
<td>N (%)</td>
<td>21 (16.8%)</td>
<td>37 (29.6%)</td>
<td>20 (16.0%)</td>
<td>74 (59.2%)</td>
<td>152 (30.4%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>N (%)</td>
<td>51 (40.8%)</td>
<td>55 (44.0%)</td>
<td>18 (14.4%)</td>
<td>22 (17.6%)</td>
<td>146 (29.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>N (%)</td>
<td>125 (100%)</td>
<td>125 (100%)</td>
<td>125 (100%)</td>
<td>125 (100%)</td>
<td>500 (100%)</td>
</tr>
</tbody>
</table>

Table 12: Percentage of patients received health education during the visit

Percentage of staff who consider the e-Health as the main tool for quality assurance: 92.9 per cent

<table>
<thead>
<tr>
<th>E health is helpful tool to improve working environment</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes to great extent</td>
<td>N (%)</td>
<td>19 (46.3%)</td>
<td>16 (69.6%)</td>
<td>11 (29.7%)</td>
<td>29 (53.7%)</td>
<td>75 (48.4%)</td>
</tr>
<tr>
<td>To some extent</td>
<td>N (%)</td>
<td>17 (41.5%)</td>
<td>7 (30.4%)</td>
<td>22 (59.5%)</td>
<td>23 (42.6%)</td>
<td>69 (44.5%)</td>
</tr>
<tr>
<td>No</td>
<td>N (%)</td>
<td>5 (12.2%)</td>
<td>0 (0.0%)</td>
<td>4 (10.8%)</td>
<td>2 (3.7%)</td>
<td>11 (7.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>N (%)</td>
<td>41 (100%)</td>
<td>23 (100%)</td>
<td>37 (100%)</td>
<td>54 (100%)</td>
<td>155 (100%)</td>
</tr>
</tbody>
</table>

Table 13: Percentage of staff who considers the e-Health as the main tool for quality assurance
Percentage of satisfied staff with the efforts that required reviewing the patient's medical history: 67.8 per cent

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to read patient history</td>
<td>65.2%</td>
<td>65.0%</td>
<td>60.1%</td>
<td>76.4%</td>
<td>67.8%</td>
<td></td>
</tr>
</tbody>
</table>

Table 12: Percentage of satisfied staff with the efforts that required to review the patient’s medical history

Percentage of staff satisfied with their work organization: 71.1 per cent

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work organization, saving and searching data on system</td>
<td>72.9%</td>
<td>70.0%</td>
<td>62.0%</td>
<td>79.2%</td>
<td>71.1%</td>
<td></td>
</tr>
</tbody>
</table>

Table 13: Percentage of staff satisfied with their work organization

Percentage of staff satisfied with their ability to use e-Health: 91.6 per cent

<table>
<thead>
<tr>
<th>How do you rate yourself in dealing with E health</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is so easy</td>
<td>N %</td>
<td>20</td>
<td>48.8%</td>
<td>17</td>
<td>73.9%</td>
<td>12</td>
</tr>
<tr>
<td>Easy to some extent</td>
<td>N %</td>
<td>13</td>
<td>31.7%</td>
<td>6</td>
<td>26.1%</td>
<td>22</td>
</tr>
<tr>
<td>Difficult</td>
<td>N %</td>
<td>1</td>
<td>2.4%</td>
<td>0</td>
<td>.0%</td>
<td>2</td>
</tr>
<tr>
<td>No response</td>
<td>N %</td>
<td>7</td>
<td>17.1%</td>
<td>0</td>
<td>.0%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>N %</td>
<td>41</td>
<td>100.0%</td>
<td>23</td>
<td>100.0%</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 14: Percentage of staff satisfied with their ability to use e-Health

Percentage of staff trained on e-Health: 63.2 per cent

<table>
<thead>
<tr>
<th>Did you attend E-health training?</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>N %</td>
<td>22</td>
<td>53.7%</td>
<td>11</td>
<td>47.8%</td>
<td>16</td>
</tr>
<tr>
<td>No</td>
<td>N %</td>
<td>19</td>
<td>46.3%</td>
<td>12</td>
<td>52.2%</td>
<td>21</td>
</tr>
<tr>
<td>I am working since less than 3 months</td>
<td>N %</td>
<td>0</td>
<td>0%</td>
<td>0</td>
<td>0%</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>N %</td>
<td>41</td>
<td>100.0%</td>
<td>23</td>
<td>100.0%</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 17: Percentage of staff trained on e-Health

Percentage of staff with basic computer training: 61.3 per cent

<table>
<thead>
<tr>
<th>Computer training</th>
<th>FO</th>
<th>Lebanon</th>
<th>Jordan</th>
<th>West Bank</th>
<th>Gaza</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>N %</td>
<td>32</td>
<td>78.0%</td>
<td>13</td>
<td>56.5%</td>
<td>23</td>
</tr>
<tr>
<td>No</td>
<td>N %</td>
<td>8</td>
<td>19.5%</td>
<td>9</td>
<td>39.1%</td>
<td>14</td>
</tr>
<tr>
<td>I am working since less than 3 months</td>
<td>N %</td>
<td>1</td>
<td>2.4%</td>
<td>1</td>
<td>4.3%</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 15: Percentage of staff with basic computer training

<table>
<thead>
<tr>
<th>Staff satisfaction about</th>
<th>FO</th>
<th>Total of all areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trainings on E health system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lebanon</td>
<td>Jordan</td>
<td>West Bank</td>
</tr>
<tr>
<td>71.9%</td>
<td>63.8%</td>
<td>64.1%</td>
</tr>
</tbody>
</table>

Table 19: Percentage of staff satisfied with the training

Percentage of staff satisfied with the e-Health patient manual. There is NO MANUAL produced so far.

Percentage of staff satisfied with the helpdesk support: 34.9 per cent

Table 16: Percentage of staff satisfied with the helpdesk support

Percentage of staff satisfied with the e-Health support: 32.9 per cent

Table 17: Percentage of staff satisfied with the e-Health support

Percentage of incidents classified as major: N/A, but frequency as below 58.1 per cent during the last week.
<table>
<thead>
<tr>
<th>Last system malfunction</th>
<th>FO</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lebanon</td>
<td>Jordan</td>
<td>West Bank</td>
<td>Gaza</td>
</tr>
<tr>
<td>Last week</td>
<td>N</td>
<td>8</td>
<td>15</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>19.5%</td>
<td>65.2%</td>
<td>83.8%</td>
<td>66.7%</td>
</tr>
<tr>
<td>Last month</td>
<td>N</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>22.0%</td>
<td>21.7%</td>
<td>5.4%</td>
<td>27.8%</td>
</tr>
<tr>
<td>1-3 months ago</td>
<td>N</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>4.9%</td>
<td>.0%</td>
<td>2.7%</td>
<td>1.9%</td>
</tr>
<tr>
<td>More than six months ago</td>
<td>N</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>7.3%</td>
<td>.0%</td>
<td>2.7%</td>
<td>.0%</td>
</tr>
<tr>
<td>Don't know</td>
<td>N</td>
<td>19</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>46.3%</td>
<td>13.0%</td>
<td>5.4%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Total</td>
<td>N</td>
<td>41</td>
<td>23</td>
<td>37</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 19: Percentage of incidents classified as major NA, but frequency as below 58.1% during the last week.
annex 5: e-health governance framework

the e-health governance

UNRWA requires a well-defined written strategy to implement, support, maintain and upgrade their e-Health System (FHT system) and also a migration strategy from classical version to FHT version for all health centres in the shortest possible timeframe as maintaining and supporting both systems had resulted in major challenges to Health Department, Information Services Division, field offices, health centres and also the stakeholders in general. The following steps are recommended as a priority to overcome these challenges and also to strengthen the information technology structure of the e-Health system:

governance structure

As implementation of the e-Health FHT is a critical UNRWA mission, it is best that a separate e-Health Project Management Unit be set up directly reporting independently to both UNRWA’s Deputy Commissioner General and Health Department directorate for a specific time length (i.e. 24 months) until the FHT system is fully operational at all health centres. The Project Management Unit would be formed by technical staff from both Information Services Division and Health Department, which would have a full-time commitment to the Project Management Unit and accountable to the Project Management Unit management, although administratively they would continue belonging to their respective departments. The Project Management Unit should be headed by an e-Health Project Manager with all stakeholders being members of the Steering Committee that should meet at least once a month. Approved minutes of these meetings should be circulated to the Deputy Commissioner General.

appointment of an e-health project manager

A strong e-Project Management Unit led by an e-Project Manager preferably with medical background and with extensive experience analyzing large information technology health systems, as it is vital that “fresh thinking and strategies” are implemented to deliver this challenging project. The e-Health Project Manager should be employed on a contract basis for 24 months and assigned a well-defined scope of work, deliverables and targets for the duration of his/her assignment, and these should be assessed every 3 months. The e-Health Project Manager should be given the necessary authority to deal with all stakeholders, employ staff required to deliver the assignment if needed and a budget.

The software design and development staff of the FHT v.5 & v.6 systems should be strengthened, as some relevant technical staff left the e-Health project. This critical situation should be addressed as a priority. A strategy should be developed to retain e-Health-experienced current staff and also design a backup plan to have a pool of trained staff coming from Information Services Division, Health Department and Quality Control unit under the e-Project manager’s leadership. UNRWA may always face the challenge of a high technical staff turnover but being e-Health FHT an internally developed system UNRWA should retain and manage the knowledge of all e-Health FHT versions to support and maintain them in the future. It should be binding that at least two Information Services Division professionally qualified information technology staff experienced in working with e-Health FHT be fulltime allocated at the e-Project Management Unit, as well as two junior staff trained as backup.

The Quality Control Unit (QCU) setup at Health Department should be assigned the responsibility of manning the help desk in addition to their current functions as they have been reviewing the functions, reporting and new requirements that should be

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70 One of the main drawbacks experienced by the e-Health project is that medical expertise was not involved in the system design until very late – June 2014 – and therefore medical specifications were left unanswered in the e-Health early stages.
included into the e-Health FHT v.5 system, based on bugs and requirements reported by the users. It would also be advisable to employ a junior person as backup to the QCU’s two senior officers as they are retired staff. Also a “transparent” mechanism such as a website (internal use only) should be setup so that support issues could be reported and analyzed, issues addressed updated and pending issues escalated to the e-Health Project management after a defined period so that these activities were monitored. This would enable the e-Health Project management to be aware of the challenges faced by field offices and health centres, as well as for planning of future upgrades and enhancements.

A detail [information technology Contingency Plan] should be formulated at the earliest as e-Health FHT v.5 is supposedly considered UNRWA’s critical system and should also include the Disaster Recovery Plan. These plans should be tested for “real life” situations at least once a year.

A well-defined [Security Policy] to access both FHT and classical systems should be formulated. The security audit should be carried-out yearly to ensure that general and application controls are in place as the system stores strictly confidential medical information of millions of people. For physical security, the main server and related equipment at health centres could be located in the senior medical officer room so that it will be in an air-conditioned dust-free environment as well as a secured area.

The current documentation of the e-Health FHT v.5 system should be further developed to encompass general information technology documentation standards. This should be carried out on an urgent basis, as the current documentation is not in line with the general standards.

An e-Health FHT v.5 system’s training calendar should be developed for periodic training for new users as well as for knowledge update of existing users. The help desk too can identify training areas based on support requests. Training should be a field office function so that they could invite users for classroom training rather than information technology staff visiting individual health centres. Web-based training (webinar’s) is also an option, so that users could join training.

The e-Health FHT system has an automated centralized system in place for data backup but it should be necessary to adopt a similar plan at every field office for all their respective health centres. A copy of the backups should be stored offsite. It is vital that regular backups are obtained from health centres using the classical System (any health centre without the centralized e-Health FHT system) until all of them have migrated to the FHT system. A health centre monitoring system of backups should be implemented at field offices until then.

Data communication issues were reported from most field offices and health centres. UNRWA should explore options for a backup data communication line to support health centres linked to field offices and headquarter as a priority. Another fall-back option is to set up a server at every health centre and to linkup with the centralized server at pre-defined intervals to upload/download data as to facilitate uninterrupted services. The fall-back option will require investment in servers.

Acute need of an e-Health project-wide communication strategy and operational planning, which would likely require external expertise.
annex 6: e-health features and efficiency gains

1. Quick and accurate electronic access to the patient’s records.
2. Improving the adherence to the patient’s appointment system and the patient’s flow at the health clinic.
3. Validation of data consistency and accuracy.
4. Improving the follow-up of cases based on the risk scoring for patients such as pregnant women and patients with non-communicable diseases.
5. Better Growth Monitoring for children as the GM Charts are plotted automatically and all growth problems are visualized in each child’s record in few seconds.
6. Alert and reminder system for each patient record i.e. due vaccination, growth problems, anaemia, allergies, etc.
7. Facilitate supervision of health services provided to the patients especially to non-communicable disease, women and children.
8. Empowerment of staff by providing them with regular indicators to monitor performance and better management for the workload.
9. Better reporting by:
   - Major reduction of time needed to produce reports.
   - Better trends monitoring.
   - Reliable, accurate and accountable reporting.
11. Improving linkage between different services at the health centre and with outside service providers.
12. Reducing patient’s waiting time by:
   - Providing the facility to record refill prescriptions for controlled non-communicable disease patients that can be picked up directly from the pharmacy without waiting at the health centre to look for the file and rewrite the prescription.
   - Providing the lab history & test results immediately available for all doctors and nurses without asking the patient to pick it up from the lab.
   - Providing faster patient’s flow (without the need for manpower to move the patient file from one station to the other), which facilitates referral between different stations.
   - Better quality of care as the system reduces the staff overload resulting in a reduction of patient’s waiting time, increasing the patient’s contact time which added value to the quality of service by having more time dedicated for patient’s education and health prevention as most patients expressed during their interviews.

The scope and deliverables for the latest version of e-Health FHT v.5 are stated below as per document provided by Health Department.

Project Scope (high level requirements)

The e-Health FHT v.5 system is being developed to meet the processes and data requirements of the FHT approach in the following areas:

1. Outpatient consultations, which includes curative consultations, assessment of non-communicable disease patients or new child examinations.
2. Maternal Services, specifically, pre-conception care, Antenatal follow-up, Postnatal care and Family Planning.

3. Child Services, which include child immunization, child growth monitoring, new-born assessment.

4. General Support Health Services: Dental, Laboratory, Specialists and Pharmacy (medicines dispensary including maintaining/dispensing the non-communicable disease periodic / repeated medicines on regular basis).

After the e-Health v.5 rollout, additional modules will eventually be added to the system: Radiology, School Health, Hospitalization, Referrals, Mental Health, Nutrition and integration with other systems i.e. lab machines and Q-system.

E-Health Project Main Deliverables

Rollout e-Health FHT v.5: a functioning e-Health system meant to be rolled out last in 2014 Sep 14th but it seems that the rollout will take place in 2015 July 15th.

Technical and user documentation (for the rollout version).

Full e-Health FHT v.5 System embedded in services operation at almost all health centres by the end of 2016, including additional modules that will be added to the system: Radiology, School Health, Hospitalization, Referrals, Mental Health, Nutrition and integration with other systems i.e. Lab machines and Q-system.

E-Health FHT v.6 (full e-Health System with basic modules; mainly with retroactive data entry and the rest of the reports) (Jun 2015).

Although refugees' basic data are extracted from the Refugee Registration and Information System and drug provision data are drawn from Procurement Inventory Management System on a daily basis, to be linked to e-health system, there is no online link between these systems. Establishing such a link will hopefully be added in the near future (with the new SAP / ERP). Also, no integration with other electronic health information versions running in the different UNRWA fields is envisaged, to be all ready by mid-2017.
annex 7: indicators

antimicrobial prescription rate

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotic prescription rate</td>
<td>24.51%</td>
<td>SD (10.1%)</td>
</tr>
</tbody>
</table>

Table 20: Antibiotic prescription rate

Overall agency-wide antimicrobial prescription rates experienced a dramatic fall from 2007 (37%) to 2008 (29.3 per cent), and then a steady slow decline until 2013 (25.1 per cent), to slightly jump again in 2014 (26.2 per cent) with the highest decline showed by West Bank Field – from 37 per cent in 2007, 30 per cent in 2011 to 21.7 per cent in 2014 – and almost no changes in the Lebanon and Gaza fields, whose rates were already low when compared with the other fields – 22.1 per cent in 2008 to 20.9 per cent in 2014 in Lebanon; 29 per cent in 2008 to 25.9 per cent in 2014 in Gaza. Gaza Field experienced a unique plunge from 2007 (55.4 per cent) to 2008 (29 per cent).

It is unlikely that the e-Health project development influenced antimicrobial prescription rates, as their decrease in most fields started well before the e-Health rollout, exception made of West Bank, where a steady plunge started in 2012. However, this evaluation can reasonably make the assumption that both the FHT approach together with the e-Health system rollout was determinant in making it happen, at least in some UNRWA fields.

number of visits per-day per-doctor

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of visits per-day per-doctor</td>
<td>107</td>
<td>Patients/doctor/day</td>
</tr>
</tbody>
</table>

Table 21: Number of visits per-day per-doctor

The average number of visits made by a doctor on a daily basis seems to be more related to efficiency gains achieved by the FHT approach than to the e-Health weight, although the system carries an appointment module that, once properly functioning – which appears to be seldom the case – may strongly influence the amount of patients being visited by a doctor.

The survey finding above appears to be slightly higher than the one reported by the Health department in 2014, although huge differences apply: while Jordan, with 84 visits on average in 2014, seems to stick to the UNRWA target 85 visits per-day per-doctor, Gaza reaches 96, being Lebanon (108) and West Bank (111). It seems, therefore, that e-Health per se does not seem to impinge on this indicator so far, being it rather more affected by the relatively unique situation Palestine refugees enjoy in Jordan in terms of healthcare access.

waiting time and patient satisfaction on contact

<table>
<thead>
<tr>
<th>Patient satisfaction</th>
<th>System</th>
<th>Full e-Health</th>
<th>Classical</th>
<th>Paper-based</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waiting time</td>
<td></td>
<td>60.9%</td>
<td>54.8%</td>
<td>55.2%</td>
<td>57.0%</td>
</tr>
<tr>
<td>Contact time</td>
<td></td>
<td>80.6%</td>
<td>77.0%</td>
<td>75.8%</td>
<td>78.0%</td>
</tr>
</tbody>
</table>

Table 25: Patient satisfaction on waiting and contact times related to the type of system used

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71 Unless mentioned otherwise, data enclosed in tables belong to the evaluation survey results
72 UNRWA Health Department. Annual Reports 2013 & 2014
73 Op cit ("Family Health Team Evaluation Draft report 22 04 2014 body v08" (page 13)
74 Op cit ("UNRWA Health Department. Annual Reports 2013 & 2014")
Patients seem to be satisfied with the length of the contact (consultation) but not that much with the waiting time. These rates are not strikingly different to those found in the satisfaction survey conducted during the FHT approach evaluation in November 2013\(^5\), when 67.5 per cent expressed their satisfaction with the waiting time in e-Health-adopted health centres – no breakdown into classical and FHT versions, although a 6.6 per cent difference might be statistically significant – and just 50 per cent in those centres without e-Health. However, if the outcomes in that survey could be used as a proxy of the contact time – “the medical officer knows my medical history very well” – the amount of satisfaction was then 62.35 per cent, obviously significantly lower than what it was found by this evaluation.

Could this outcome on waiting time be attributed to the duplication of work and using different systems? It seems though that patient satisfaction is moderately higher in health centres applying the full E-health. Regarding contact time, it seems unlikely that this increased satisfaction accurately reflects reality if reduced contact time – due both to a swell in the number of visits per doctor and the time spent by the medical officer in shifting from one e-Health screen to the other, which in some centres may reach up to four minutes – is matched against that expressed satisfaction. So there might be some subjectivity in the patients’ responses to the survey.

In the area of accountability, there is almost no channel to hear the patients’ feedback or opinions, as only four per cent of all patients interviewed said that they could provide feedback or comments to the health clinic management.

**health centre staff satisfaction with e-health support**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>health centre staff satisfaction with e-Health support</td>
<td>71.10%</td>
<td>Satisfaction rate</td>
</tr>
</tbody>
</table>

Table 26: Health centre staff satisfaction with e-Health support

Significantly enough, health centres’ staff satisfaction with e-Health seems to have increased when compared with results obtained by the FHT approach evaluation survey\(^6\), when staff appeared to be more satisfied working with the FHT approach without e-Health than within.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am satisfied with the service that is delivered in the health centre</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FHT and e-health</td>
<td>82.37%</td>
<td></td>
</tr>
<tr>
<td>FHT</td>
<td>86.60%</td>
<td></td>
</tr>
<tr>
<td>e-health</td>
<td>77.95%</td>
<td></td>
</tr>
<tr>
<td>No FHT no e-health</td>
<td>82.86%</td>
<td></td>
</tr>
</tbody>
</table>

Table 27: Impact of FHT approach on services ("Family Health Team Evaluation Draft report 22 04 2014 body v08")

**quality standards for: consultations, maternal and child health, non-communicable disease, etc.**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality standards for: consultations, maternal and child health, non-communicable disease...</td>
<td>48%</td>
<td>Improved consultation time</td>
</tr>
</tbody>
</table>

Table 28: Quality standards for: consultations, maternal and child health, non-communicable disease

Under the e-Health system, patients are more satisfied with the quality of the consultations, diagnosis, treatment, and screening, so 48 per cent stated that one of the main advantages of the e-Health system is that it improved the quality of the consultations, as “doctors have immediately

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\(^5\) Op cit ("Family Health Team Evaluation Draft report 22 04 2014 body v08") (page 18)

\(^6\) Ibid (page 20)
a patient’s information on the screen, no need to ask those same questions all the time, they have a record with the lab results…” all together providing a feeling of endorsement about the services provided.

Interestingly, when asked about the advantages of the e-Health system, quality came at the second place just after the speediness and discipline in patient’s responses.

**screening, diagnosis and treatment patterns of non-communicable disease**

<table>
<thead>
<tr>
<th>non-communicable disease</th>
<th>FO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>screen increased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>3 (7.3)</td>
<td>19 (12.3)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>4 (17.4)</td>
<td>23 (14.8)</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>5 (13.5)</td>
<td>65 (41.9)</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>7 (13.0)</td>
<td>48 (31.0)</td>
</tr>
<tr>
<td>Total</td>
<td>17 (41.5)</td>
<td>155 (100)</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>screen decreased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>3 (7.3)</td>
<td>20 (12.0)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>1 (4.3)</td>
<td>9 (5.6)</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>3 (8.1)</td>
<td>31 (20.0)</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>16 (29.6)</td>
<td>41.3</td>
</tr>
<tr>
<td>Total</td>
<td>21 (49.6)</td>
<td>155 (100)</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>treatment increased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>1 (2.4)</td>
<td>7 (4.5)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>2 (8.7)</td>
<td>14.8</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>1 (2.7)</td>
<td>13.0</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>3 (5.6)</td>
<td>13.0</td>
</tr>
<tr>
<td>Total</td>
<td>6 (13.1)</td>
<td>40.7</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>treatment decreased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>7 (17.1)</td>
<td>49 (31.6)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>8 (34.8)</td>
<td>40 (25.8)</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>9 (24.3)</td>
<td>55.6</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>25 (46.3)</td>
<td>55.6</td>
</tr>
<tr>
<td>Total</td>
<td>49 (31.6)</td>
<td>55.6</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>treatment no change</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>15 (36.6)</td>
<td>55.6</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>2 (8.7)</td>
<td>13.0</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>7 (18.1)</td>
<td>13.0</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>16 (29.6)</td>
<td>13.0</td>
</tr>
<tr>
<td>Total</td>
<td>30 (55.6)</td>
<td>55.6</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>treatment increased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>18 (43.9)</td>
<td>59 (38.1)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>11 (26.8)</td>
<td>49 (31.6)</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>8 (18.9)</td>
<td>13.0</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>20 (44.8)</td>
<td>13.0</td>
</tr>
<tr>
<td>Total</td>
<td>59 (38.1)</td>
<td>13.0</td>
</tr>
<tr>
<td>non-communicable disease</td>
<td>FO</td>
<td>Total</td>
</tr>
<tr>
<td>treatment decreased</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>FO Lebanon</td>
<td>23 (100)</td>
<td>155 (100)</td>
</tr>
<tr>
<td>FO Jordan</td>
<td>10 (50.0)</td>
<td>55.6</td>
</tr>
<tr>
<td>FO West Bank</td>
<td>37 (100)</td>
<td>41.3</td>
</tr>
<tr>
<td>FO Gaza</td>
<td>54 (100)</td>
<td>41.3</td>
</tr>
<tr>
<td>Total</td>
<td>155 (100)</td>
<td>41.3</td>
</tr>
</tbody>
</table>

Table 29: Results of health centres’ staff perceptions on non-communicable disease outcomes

Fully implemented e-Health – both classical v5.6 and FHT v.4 have a non-communicable disease module – significantly contributed to improve quality of service provision to non-communicable disease patients77. The e-Health system allows managing non-communicable disease patients according to approved guidelines such as drug treatment reselection and follow-up visit schedule. The e-Health also records all previous procedures including earlier prescriptions, lab tests, and doctors and nurses’ notes. FHT approach with FHT v.4 e-Health system further improved non-communicable disease patient’s management. For instance, FHT v.4 has a separate window indicating risk factors related to non-communicable disease patients and time schedule when the beneficiary should visit for follow-up.

While the evaluation survey showed a much-improved perception of non-communicable disease diagnosis and to a lesser extent non-communicable disease screening by the staff, actual perceptions on change remained very low: 72.9 per cent either didn’t perceive any change in non-communicable disease screening or simply didn’t know while 63.9 per cent could not tell of any improvement in non-communicable disease treatments.

**decrease in medical errors**

E-Health-based patient records provide a detailed picture of a patient’s health status and as a result help prevent errors in diagnose and drug prescription. Examination of existing paper-based

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77 all health centre with e-Health visited confirmed this statement
evaluation of the e-health project

records in all visited health centres without e-Health indicated that they provided fairly complete and accurate patient records; however, no adequate system was identified to prevent illegitimate prescriptions – this was mentioned by many senior medical officers from all fields. The present e-Health system assists doctors to prescribe according to agreed protocols and minimizes human errors in drug prescription through selection of drugs and required dosage. For instance, non-communicable disease patients usually have a long list of drugs already recorded during the first visit and the doctor can easily copy this list in the new prescription form being able to change it as needed. Because of this efficient prescription system drugs prescribed are the right ones and medical errors minimized at doctor and pharmacy level and prevent illegitimate prescription. These benefits are also recorded internationally (Bakker, 2007; Bates et al., 2003; Kuperman et al., 2007; Warshawsky et al. 1994; Allan et al. 2000, Staroselsky et al., 2006).

Table below indicating that health centres with e-Health spending on average two days to prepare each report, which is significantly higher compared with paper-based centres where it is 1.3 days. At the time of the evaluation the reports were still not fully functioning and some reports required preparation up to 90-days in health centres with e-Health compared with paper-based centres where the same reports are finalized in 10 days. Most challenging reports are:

- Annual Report on Special Care for non-communicable disease
- Risk status (non-communicable disease)
- Outcome Of Pregnant Women Registered At UNRWA Antenatal Clinic
- Growth Retarded Children (Growth problems) Report
- Population served on available family file
- Management Health Information System on non-communicable disease

Errors in reporting are also found in health centres with e-Health systems (70 per cent) compared with 20 per cent in paper-based ones.

The main reason for the excessive time spent and higher number of errors reported in health centres with e-Health is the lack of standardization in data collection and also a lack of clear guidelines. As a result health staff requires performing double and in some cases triple work to prepare reports.

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78 Bakker A.R. (2007) The need to know the history of the use of digital patient data, in particular the EHR. International Journal of Medical Informatics, Volume 76, Issues 5-6, May-June, Pages 438-441
<table>
<thead>
<tr>
<th></th>
<th>Total To prepare report</th>
<th>e-health To prepare report</th>
<th>Total To prepare report</th>
<th>Total Errors from first to last draft (quality)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>1.9</td>
<td>0.9%</td>
<td>2.0</td>
<td>1.0%</td>
</tr>
<tr>
<td>Max</td>
<td>90</td>
<td>70%</td>
<td>90</td>
<td>70%</td>
</tr>
</tbody>
</table>

Table 30: Number of days require and errors in preparation of the 39 standard reports for Health Department
annex 8: patient flow analysis

<table>
<thead>
<tr>
<th></th>
<th>Average time per service (in min)</th>
<th>Waiting line (before reg.)</th>
<th>Registration</th>
<th>Nurse station</th>
<th>Lab consult</th>
<th>medical officer consult</th>
<th>Pharmacy</th>
<th>Time spent (TOTAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>e-Health/paper</td>
<td>15</td>
<td>2.5</td>
<td>21</td>
<td>26</td>
<td>33</td>
<td>11</td>
<td>123</td>
<td></td>
</tr>
<tr>
<td>e-Health</td>
<td>12</td>
<td>1.5</td>
<td>17</td>
<td>23</td>
<td>30</td>
<td>13</td>
<td>108</td>
<td></td>
</tr>
<tr>
<td>Paper based</td>
<td>25</td>
<td>6</td>
<td>33</td>
<td>38</td>
<td>43</td>
<td>7</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>Hakeem</td>
<td>20</td>
<td>10</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>190</td>
<td>340</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Average time spent by the patients visiting the health centre

Table below indicates that average waiting time **before reaching the health centre clerk office** is lower (12 minutes) in centres with e-health system installed compared with those centres using paper-based management (25 minutes). It has to be remarked that at JFO, all health centres are equipped with electronic queue system and the average waiting time is 10 minutes, much better if compared with other field offices using e-Health.

**Clerk service** with e-Health in place is significantly better compared with those centres using paper. On average, centres with e-Health take 1.5 minutes to serve beneficiaries while paper-based centres require six minutes to perform the same task. Accuracy and confidentiality provided by e-Health significantly improved clerks’ workload. Clerks require less office space, as they do not require case note file furniture, less staff manage large amount of patients and almost not using papers and other stationery. Health centres with more than 3 Medical Officers in place profited more from e-Health while small centres with 1-2 Medical Officers did not see any significant improvement (from time required to provide service) in clerk serves provision.

**Nurses** in health centres with e-Health provided services much faster (average time 17 minutes) compared with nurses in those centres without e-Health system in place (average 33 minutes). Quality of services provided in centres with full e-Health was also better. The e-Health system assists nurses to manage beneficiaries in a systematic order and the required information (doctors’ notes, follow-up visits, etc.) is in a clear and logical form, and no information is missing or misinterpreted. Nurses from all field offices mentioned particularly appointment system as a useful tool to manage patient’s follow-up.

**Laboratory** services’ average time is 26 minutes in both e-Health and paper based health centres. However, in paper-based centres beneficiaries may stay up to 120 minutes, particularly so where shortage of health personnel and the population served is more than 50,000. An e-Health health centre average time is 23 minutes and in those paper-based 38 minutes. Laboratory service with e-Health can perform better if they will move to complete e-Health and will stop double work by entering test results in the paper journals. Laboratories with only e-Health recoding perform better and records have fewer errors.

In almost all laboratories equipped with modern lab equipment and a performing e-Health, results can be “translated” into the software. This automatic transfer of lab results to the e-health (Hakeem has this system installed) improves quality of service through reduction of human error and reduced time patient spends to receive results.

Waiting time to see a Doctor is slightly higher (43 minutes) in the paper-based health centres compared to those with e-Health (30 minutes). There is no significant difference between FHT and classical approach. Minimum time to see a doctor in both e-health and paper-based system is 15 min and maximum waiting time in both systems around 60 min. All doctors using e-Health mentioned that the system allowed them better organizing follow-up and second visits. Patients also appreciate e-Health because it brings “modernity” and “high technology” in UNRWA health centres.
The e-Health significantly improved pharmacy waiting time in those health centres where the number of medical doctors was more than 3 and the population served more than 100,000 ("big health centre"). However, in those centres with 1-2 medical officers and population served up to 30,000 no significant difference between e-health and paper-based systems was detected. Waiting time in the table above is misleading because it is depending on the size of the health centre and number of beneficiaries served. It has to be mentioned in this particular table that we have to focus on the average time spent per beneficiary: 11 minutes. From service delivery point of view there is not difference between e-Health and paper-based services. In both cases assistant pharmacists spend approximately one min with the beneficiary. However, in the pharmacy system e-Health significantly contributed to improving quality of service provided. In “big health centres” e-health streamlined reporting system and minimized errors. It reduced staff of the pharmacy up to 50 per cent and allowed better control of drugs. Many health centres with only e-Health system perform excellently and producing reports automatically without mistakes. Conversely, stand-alone “pharmacy” module or pharmacy with one or two modules is not successful. Stand-alone pharmacy module creates confusion, double work and it is not serving its purpose to reduce errors and increase efficiency. Success of the pharmacy module is achieved only when all modules are working as one integrated process.

**Overall** e-Health improved patients’ satisfaction. Patients spent in average less time in health centres with e-health (108 minutes) compared with those paper based (177 minutes). Health care providers manage flows of patients better particularly where queue system was present (in Jordan) and “real” contact time with beneficiaries is higher in centres with e-Health. Significant financial savings (in big health centre stationary saving can be up to US$ 70,000 annual) and reduction of staff in clerk and pharmacy services is up to 50 per cent. Reporting in clerk, pharmacy services are adequate however rest services require improvement.
annex 9: e-health implementation steps

13 Steps to start with e-Health in 3 months

Month 1

1. Inform and discuss with health center staff
2. Situation analysis

Month 2

3. Health Centre
   Hardware Readiness
4. Identify data entry support staff needed
5. Basic Computer training for all staff
6. LAN Setup and connectivity
7. Systems training for data entry staff
8. ‘Train – the – Trainer’
9. Ensure backup connection
10. Data entry of Patient Files
11. Systems training for all staff
12. ‘Go Live’ – Dual System, manual and electronic
13. Implement full paperless system

Month 3

14. Implement full paperless system

NOTE: The above 13 steps are mutually interlinked, and not mutually exclusive. Timing and sequence of implementation of the 13 steps could be different according to the local situations and needs.

Table 1: e-Health project “e-Health implementation steps. 08_07_2014

A Project Manager – preferably a P5 or an independent consultant (US$ 150,000/year or US$ 96,000 in the case of an external consultant) transferred to the local senior national officer post after 24 months (US$ 60,000/year)

One (1) P3 Technical information technology coordinator for 24 months (US$ 100,000/year) transferred later to the local senior national officer post (US$ 60,000/year) at headquarters Amman.

Three (3) information technology local special service agreements initially 10 months (30,000 x 3 = US$ 90,000/year) transferred later to national officer, at headquarter Amman.

Two (2) quality control and monitoring and evaluation officers special service agreement for 10 months (30,000 x 2 = US$ 60,000/year) transferred later to national officers, at headquarter Amman.

Four (4) help desk assistants special service agreements (US$ 5,000 x 4 = US$ 20,000/year) at headquarter Amman

Four (4) e-Health coordinators at each field office are special service agreement staff for 10 months (30,000 x 4 = US$ 120,000/year) transferred later to national officer, at headquarter.

Estimated first year: US$ 605,000; estimated second year: US$ 540,000;

hardware

Equipment and communication assessment in each field office by project staff with clear costing and redlines (maximum 3 months). Costs may vary from one field office to another. Internet line will be the biggest challenge in all field offices.

online / offline backup servers

Each health centre computer will have synchronisation with the Area Office server online/offline options – to insure continuity
of the system and provision of services to beneficiaries:

Area Office server connecting with field office server – this will allow to address all problems in a timely manner.

A field office server connecting with headquarters Amman – taking into account that internet connectivity is a challenge in all countries and it will require additional costs to ensure data exchange. Therefore it is more cost-effective to use “low traffic time” (after office hours, etc.) to do data exchange with central server.

This multi-stage data exchange also means a good data backup in case of data losses. Of course, data security should be addressed in any server point. Data will be updated on a regular basis and in case of any problem (technical etc.) it can be fixed faster due to the existence of the Area Offices. After implementation of a proper reporting system Senior Staff Nurses at health centre level and Area Nurses at the Area Office level will have more time to manage e-Health and will be able to do monitoring and supervision, and they will ensure smooth management of the system.

Estimated computer equipment US$ 150,000 per field office (estimated total US$ 600,000) with annual minimum US$ 20,000 for upgrade/upkeep (estimated total US$ 100,000).

It has to be mentioned that these are tentative estimated costs and detailed budgeting should be conducted by the e-Health project with all relevant departments and field offices.

Communication/internet line should be solved within UNRWA existing system and initial estimate of US$ 100,000 per field office (estimated total US$ 500,000) will require for fixing communication issues with minimum US$ 20,000 annual upkeep (total estimated annual US$100,000).

Estimated first year: US$ 1,000,000; estimated second year: US$ 180,000; estimated third year: US$180,000

Software final tuning: within 3 months all staff, International and National consultants included, should fix all major issues within the system in every field office.

Estimated first year: US$ 65,000; estimated second year: US$ 0; estimated third year: US$ 0

Rollout phase: all e-Health project staff will move to the selected field office where implementation will start for two months to insure that in three months all health centres moved to FHT v.6. The five field offices should be operational within 12 months after the rollout.

Estimated first year: US$ 120,000 travel and TSA cost; estimated second year: US$ 80,000 travel and TSA cost; estimated third year: US$ 50,000 travel and TSA cost.

Total Estimated first year cost: US$ 1,790,000; estimated second year: US$ 800,000 travel and TSA cost; estimated third year: US$ 64,000.
annex 10: cost assessment

This evaluation received e-Health running yearly estimated cost if UNRWA fully adopted e-Health in all its Health Centres to ensure regular maintenance of e-Health project:

<table>
<thead>
<tr>
<th>Number</th>
<th>Shared cost</th>
<th>Type of cost</th>
<th>Yearly Cost (US$)</th>
<th>Assumptions (All prices in US$)</th>
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</thead>
<tbody>
<tr>
<td>Server (main)</td>
<td>4</td>
<td>100%</td>
<td>Depreciation cost</td>
<td>8,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depreciation = 5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 years guarantee plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Additional two servers will be added next year; the total number of servers will be 4.</td>
</tr>
<tr>
<td>Mini server</td>
<td>137</td>
<td>100%</td>
<td>Depreciation cost</td>
<td>54,800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depreciation = 5 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 years guarantee plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Applicable once UNRWA will apply the online/offline mode</td>
</tr>
<tr>
<td>PCs</td>
<td>2,863⁷⁷</td>
<td>100%</td>
<td>Depreciation cost</td>
<td>572,600</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Depreciation = 5 years</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>5 years guarantee plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Applicable once UNRWA will apply the online/offline mode, because the synchronisation with the main servers will be after working hours.</td>
</tr>
<tr>
<td>UPS</td>
<td>137</td>
<td>100%</td>
<td>Depreciation cost</td>
<td>95,900</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Depreciation = 5 years</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Once UNRWA applies online/offline mode</td>
</tr>
<tr>
<td>Firewall</td>
<td>137</td>
<td></td>
<td>Licence cost</td>
<td>68,500</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yearly License cost per computer =13</td>
</tr>
<tr>
<td>Antiviruses</td>
<td>3,000</td>
<td>100%</td>
<td>Licence cost</td>
<td>39,000</td>
</tr>
<tr>
<td>SQL Server</td>
<td>100%</td>
<td>Licence cost</td>
<td>14,000</td>
<td></td>
</tr>
<tr>
<td>Internet connection (headquarter &amp; FOs)</td>
<td>6</td>
<td>100%</td>
<td>Licence cost</td>
<td>136,000</td>
</tr>
<tr>
<td>Internet connection (health centres)</td>
<td>137</td>
<td>100%</td>
<td>Internet connection cost</td>
<td>49,320</td>
</tr>
<tr>
<td>ICT maintenance cost – Host</td>
<td>100%</td>
<td></td>
<td></td>
<td>85,000</td>
</tr>
</tbody>
</table>

⁷⁷ Unless stated otherwise, the information below was provided by the e-Health project

⁷⁷ Health Department Annual Report 2014
### Evaluation of the e-Health Project

(headquarter Amman)

<table>
<thead>
<tr>
<th>Service</th>
<th>Quantity</th>
<th>Percentage</th>
<th>Cost (Yearly)</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity (additional cost)</td>
<td>3,000</td>
<td>100%</td>
<td>1,575,000</td>
<td>KW average cost = 0.2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC = 300W/h</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PC working hours = seven hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Working days = 250</td>
</tr>
<tr>
<td>Regular Staff Cost - ISS</td>
<td></td>
<td></td>
<td>25,000</td>
<td></td>
</tr>
<tr>
<td>Project Manager P4</td>
<td>1</td>
<td>100%</td>
<td>98,000</td>
<td>Yearly cost = 98,000</td>
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<tr>
<td>e-Health project coordinator, P3</td>
<td>1</td>
<td>100%</td>
<td>78,000</td>
<td>Yearly cost = 78,000</td>
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<tr>
<td>Quality assurance consultant</td>
<td>2</td>
<td></td>
<td>80,400</td>
<td>Dr. Consultant monthly salary = 4,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Nr consultant monthly salary = 2,500</td>
</tr>
<tr>
<td>Eh-Health system Analyst</td>
<td>3</td>
<td>100%</td>
<td>70,920</td>
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<tr>
<td>Helpdesk</td>
<td>21</td>
<td>50%</td>
<td>126,000</td>
<td>Monthly helpdesk assist salary = 1,000</td>
</tr>
<tr>
<td>Maintenance (Mouse, keyword, etc.)</td>
<td>137</td>
<td>100%</td>
<td>68,500</td>
<td>Yearly cost = 500 per health centre</td>
</tr>
<tr>
<td>Training</td>
<td>150</td>
<td>100%</td>
<td>150,000</td>
<td>Training session cost = 1,000</td>
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</tbody>
</table>

**Total Yearly Cost to run the E-Health over all field of operations**: 3,394,940

Table 14: E-Health recurring costs for future years, according to information provided by Health Department
All health centres implementing e-Health train users on the regular basis but due to the lack of standardisation of the e-Health system in field offices no standard training manual exists and no standard certification mechanism is established to ensure benchmarking and quality of the system’s end users. In addition, many field offices employ on the temporary basis daily-paid staff (doctor and nurses) and to have standard certification mechanism will also minimise mistakes in system usage.

The present system of collecting technical issues/complaints related to the software is not adequate. Lack of standardized complaints and feedback system with end-users negatively impact on them and discourage them to submit further complaints/ comments/suggestions. As a result, not all complaints/bugs are recorded / managed and numbers provided by information technology team are not reflecting the real picture on the ground. Herewith below a summary of the topics encountered:

**how backups are done**

**For the classical**: an automated process is performed at the closure of every daily business in each health centre mini-server to take a backup of the database. Then a tool to copy it automatically on to a server at the field office in Lebanon and Gaza is set up. The same process is available for Jordan health centres and backups are copied on to a server at JFO but as the FICTO (Field Information Communication Officer) refused to take such responsibility, Health Department requested Information Services Division to provide space on a server to have another copy of this backup.

**For the FHT version**: backups are done by Information Services Division (operations unit).

In summary, data backups are maintained in field offices (Gaza and Lebanon) and the Jordan health centres’ backups are maintained at headquarter Amman Information Services Division. Backup should be maintained at JFO, too, and the FICTO should be entrusted with this task in writing and monitored to ensure compliance. What is required in the health centres is just a PC with a good specification to act as the server and not a big server.

**How many staff is allocated** at health centres, field offices and headquarters for backing up of classical and FHT system data?

**For the classical** it is done automatically and checked by the information technology support at the field office.

**For the FHT version** backup is checked by the Operations Unit in Information Services Division (led by Hiatham Habboush).

**How was the training conducted** to users initially for classical and FHT system?

**For the classical**: initially, headquarter core team at that time (Fadi, Loai & Ghada) conducted training. They were building capacity among the information technology support staff at each field office for them to take over. On-the-job training in Gaza and Lebanon was conducted by each field office’s information technology support staff during implementation.

The training of the FHT version is being conducted by each field office’s information technology support staff while the Health Department core team takes care of the orientation whenever a workshop is planned at headquarter (NO DATES OR PLAN WAS GIVEN OR AVAILABLE).

**How many users were trained** in 2015 for classical and FHT system?

In 2015, Health Department discontinued the classical version expansion, so no training was conducted for the classical system. Only training for 300 users using the FHT version was conducted.

**What is the frequency of training**? Do you have a training plan, if so please share?
Training is conducted whenever a new health centre is planned for deployment. Initially, basic ICT training is given for computer literacy followed by system training for the centre’s key staff, followed by on-the-job training for all staff.
annex 11: list of people interviewed

<table>
<thead>
<tr>
<th>Last Name, First Name</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbas, Abdulkader</td>
<td>Borj Elbarajneh HC MO</td>
</tr>
<tr>
<td>Abd Rahim, Shageia Abdallah</td>
<td>Taybeh HC SSN</td>
</tr>
<tr>
<td>Abdalla, Inass</td>
<td>Saida polyclinic HC SSN</td>
</tr>
<tr>
<td>Abed, Shadi</td>
<td>Finance Dept. Director</td>
</tr>
<tr>
<td>Abou Daresh, Monther</td>
<td>El Buss Camp HC Lab technician</td>
</tr>
<tr>
<td>Abu Amrah, Abeer</td>
<td>Saffawi HC SSN</td>
</tr>
<tr>
<td>Abu Elghani, Ahmad</td>
<td>Borj Elbarajneh HC pharmacy assistant</td>
</tr>
<tr>
<td>Abu Ghosh, Zeid</td>
<td>Hakeem programme Director</td>
</tr>
<tr>
<td>Abu Habeeb, Ziyad</td>
<td>Jabalia North HC MO</td>
</tr>
<tr>
<td>Abu Hmaid, Ibtisam</td>
<td>Al Naser HC SSN</td>
</tr>
<tr>
<td>Abu Khalil, Aref</td>
<td>LFO HRS officer</td>
</tr>
<tr>
<td>Abu Mousa, Amer</td>
<td>Saffawi HC nurse</td>
</tr>
<tr>
<td>Abu Muhadi, Mohammad</td>
<td>Saffawi HC SSN</td>
</tr>
<tr>
<td>Abu Saman, Amal</td>
<td>Saffawi HC Pharmacy assistant</td>
</tr>
<tr>
<td>Abu Saﬁa, Amal</td>
<td>Saffawi HC SSN</td>
</tr>
<tr>
<td>Abu Traba, Bassam</td>
<td>Jareesh Camp HC Pharmacy assistant</td>
</tr>
<tr>
<td>Abu Uwaimer, Imad</td>
<td>Nuseirat Middle HC MO</td>
</tr>
<tr>
<td>Abu Zaid, Othman</td>
<td>Hashimi Comprehensive Clinic (Amman) Manager</td>
</tr>
<tr>
<td>Abu Didiab, Rasha</td>
<td>Aqaba Camp HC Lab technician</td>
</tr>
<tr>
<td>Abu-Halawe, Khitam</td>
<td>Main Baqaa HC SSN</td>
</tr>
<tr>
<td>Abusamra, Manal</td>
<td>West Nuseirat HC SMO</td>
</tr>
<tr>
<td>Abu-Zayed, Ishtiaawi</td>
<td>Mushierfeh HC MO</td>
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<tr>
<td>Abu-Zayed, Ishtiaawi</td>
<td>JFO Health Programme Chief</td>
</tr>
<tr>
<td>Abuziyid, Reham</td>
<td>Aqaba Camp HC nurse</td>
</tr>
<tr>
<td>Afﬁ, Laila</td>
<td>Rafah HC SSN</td>
</tr>
<tr>
<td>Agha, Kafina</td>
<td>El Buss Camp HC nurse</td>
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<tr>
<td>Al-Abed, Buthayna</td>
<td>Main Baqaa HC MO</td>
</tr>
<tr>
<td>Al-Akraes</td>
<td>JFO AHO</td>
</tr>
<tr>
<td>Alamassi, Wafaa</td>
<td>West Nuseirat HC MO</td>
</tr>
<tr>
<td>Alawawdeh, Maram</td>
<td>Amman New Camp HC SSN</td>
</tr>
<tr>
<td>Al-Biss, Ahmad</td>
<td>Taybeh HC SMO</td>
</tr>
<tr>
<td>Al-Far, Nisreen</td>
<td>Al-Husn Camp HC Lab technician</td>
</tr>
<tr>
<td>Al-Ghrouz, Kholoud</td>
<td>Hebron HC Lab technician</td>
</tr>
<tr>
<td>Alhourani, Mhmed Mounir</td>
<td>Amman New Camp HC MO</td>
</tr>
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<td>Ali, Ala Hasan</td>
<td>Sabra HC MO</td>
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<td>Ali, Ali</td>
<td>LFO ICT e-Health coordinator</td>
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<tr>
<td>Ali, Ayat Abu</td>
<td>Mushierfeh HC nurse</td>
</tr>
<tr>
<td>Al-Jishi, Aida</td>
<td>Borj Elbarajneh HC SSN</td>
</tr>
<tr>
<td>Al-Khalout, Mahmoud</td>
<td>GFO Health Programme coord</td>
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<td>Al-Khatib, Luai</td>
<td>Main Baqaa HC MO</td>
</tr>
<tr>
<td>Almasri, Taghreed</td>
<td>GFO MIS Coord</td>
</tr>
<tr>
<td>Al-Miari, Ibrahim Yousef</td>
<td>Tyre El Buss ANO</td>
</tr>
<tr>
<td>Alnabulsi, Akram</td>
<td>Amman New Camp HC Lab technician</td>
</tr>
<tr>
<td>Almaj, Mohamad Abu</td>
<td>Mushierfeh HC pharmacy assistant</td>
</tr>
<tr>
<td>Al-Najjar, Nahla</td>
<td>Al-Husn Camp SSN</td>
</tr>
<tr>
<td>Al-Natsheh, Khalid</td>
<td>Hebron HC MO</td>
</tr>
<tr>
<td>Al-Sheikh, Ahmad</td>
<td>Maen HC pharmacy assistant</td>
</tr>
<tr>
<td>Al-Thaher, Ajmad</td>
<td>JFO IT officer</td>
</tr>
<tr>
<td>Al-Zamli, Ahmed</td>
<td>Maen HC MO</td>
</tr>
<tr>
<td>Ammoura, Mustafa</td>
<td>El Husn AHO</td>
</tr>
<tr>
<td>Anati, Salah</td>
<td>Hashimi Comprehensive Clinic (Amman) SCI</td>
</tr>
<tr>
<td>Anati, Saleem</td>
<td>Shu'fat HC MO</td>
</tr>
</tbody>
</table>
evaluation of the e-health project

Ata, Dina
Audette, Meg
Awad, Abdul Karim Hashim
Awad, Yasser
Awamreh, Khawla
Awan, Aamir
Badawi, Izedehar-Jummá
Baker, Khalil
Ballout, Ghada
Balour, Suhair
Berry, Edwin
Breik, Majdi
Breik, Osama
Buckley, Samantha
Chanaa, Abdel Hakim
Chetri, Vickram
Colquhoun, Anne
Da’as, Mustafa
Dabour, Adel
Darweish, Erma
Davidson, Amelia
Davies, Roger
Dawahidi, Ihab
Dayal, Uday
Dirawi, Anwar
El Awour, Imad
El Sadek, Najeh
El_Helou, Ali
El-Ash, Ata Abu
Elbairani, Nabeel
El-Habil, Qader Ali
El-Khabib, Zoheir
El-Kurdi, Nour Eddine
El-Madhoum, Ramzi
El-Muqayad, Ghada
El-Nabahin, Kamla
El-Najjar, Kefah
El-Sheikh
Elshouli, Jamil
Farrajallah, Loai
Habbe, Mohammad
Haboub, Ahmad
Haddad, Nizar
Haddar, Adlah
Hamad, Alaa
Hamad, Nemeen
Hamdaheh, Abdullah
Hamad, Fatema
Hamad, Huda
Hamad, Khalil
Hamad, Nawal
Hamad, Osama
Hammour, Nadwa A’sd
Hamzeh, Sujoud
Hani, Tamara
Hanoti, Ahlam

Mushierfeh HC SSN
WBFO Health Programme Support officer
Hebron HC MO
Amman New Camp HC SSN
Hebron HC nurse
Finance Dept Budget Chief
Old Askar HC SSN
Jaresh Camp HC Lab technician
e-Health Project Manager
Nuseirat Middle HC pharmacy assistant
Planning Dept officer
Old Askar HC pharmacy assistant
Amman New Camp HC MO
Health Dept assistant
Saída policlinic AHO
JFO Field Programme Support officer
LFO Programme Support Officer
ISD Officer
Jabalía North HC Lab technician
Aqabat Jaber HC SSN
DIOs assistant
JFO Director
Saftawi HC Lab technician
LFO Financial officer
Rafah HC pharmacy assistant
Saftawi HC SMO
LFO Health Programme Chief
PA MOH Eng & Comp Unit Director
Jabalía North HC pharmacy assistant
Khan Younis HC pharmacy assistant
Sabra HC SMO
Khan Younis HC SMO
Rafah HC Lab technician
Jabalía North HC MO
Jabalía North HC nurse
Sabra HC SSN
Jabalía North HC SMO
WBFO Health Programme Support officer
LFO Financial officer
ISD technician
Amman New Camp HC pharmacy assistant
Saftawi HC MO
Hashimi Comprehensive Clinic (Amman) Family Med
Hebron HC SSN
West Nuseirat HC pharmacy assistant
Shu’fat HC SSN
Al-Husn Camp HC MO
Nuseirat Middle HC SSN
El Buss Camp HC nurse
Nuseirat Middle HC SMO
West Nuseirat HC SSN
Al Naser HC SMO
Saida policlinic ANO
Taybeh HC Lab technician
Taybeh HC SSN
Al Naser HC Lab technician
evaluation of the e-health project

Hassoun, Iyad
Haydar, Hamad
Hejji, Dia
Horani, Nawal
Hurt, Robert
Hutton, Dave
Ibrahim, Ishaq
Jaber, Nariman
Jamal Abu, Zubaida
Jamal, Jumana
Jebri, Adel
Johary, Osama
Juma, Iyad
Karaki, Salim
Karoum, Souhir
Kassab, Fawzi
Kassim, Nimer
Katkhuda, Suhail
Khader, Ali
Khalili, Mohammed
Khammash, Umayeh
Kharouf, Khaled
Khnouf, Bassam
Khouri, Samah
Klaus, Dorothy
Kolab, Yazid
Kuhiel, Mohd Wasfi
Londén, Laura
Lubbad, Hana
Maarouf, Isam
Mansour, Khalid
Marks, John
Miari, Wael
Moghrabi, Khaled
Mohd, Kamal
Moustafa, Ibrahim
Musa, Ghada Abu
Najjar, Nasser
Najjar, Sanna
Naseraddin, Fuad
Nasseraddin, Fuad
Nasses, Ghassan
Nimer, Najia Abu
Obaid, Nabil Abu
Othman, Mahfouz
Pokharel, Sweta
Qalaq, Agela
Qamar, Ziyad
Qandeel, Reham
Qaramn, Neama
Qasem, Bahar’a
Qazaz, Basim
Qedra, Mahdi
Quqa, Rihab
Rahme, Mahmoud
Ramlawi, Asaad
Rantissi, Randa

Saida polyclinic HC dentist
Tyre El Buss AHO
PA MOH Preventive Med Director
Al Naser HC nurse
Planning Dept Director
WBFO Deputy Director
Main Baqaa HC pharmacy assistant
West Nuseirat HC Lab technician
Rafah HC nurse
Mushierfeh HC Lab technician
WBFO ICT Coord
Main Baqaa HC Lab technician
Rafah HC MO
Hebron HC pharmacy assistant
Wadi Alzeineh HC MO
Tyre El Buss ACO
LFO e-Health focal point
ISD Director
Health Dept Deputy Director (FHT Coord)
WBFO Health Programme deputy chief
WBFO Chief Health Programme
PA MOH Preventive Med officer
JFO Deputy Chief Health Programme
US Dept of State officer
JFO Deputy Director
Khan Younis HC MO
Sabra HC MO
HR Department Director
GFO Health Programme SSN
Borj Elbarajneh HC dentist
Danish representation officer Ramallah
Deputy Director of UNRWA Affairs LFO
Saida polyclinic HC MO
Al Naser HC MO
Borj Elbarajneh HC Lab technician
Saida polyclinic HC Lab technician
Khan Younis HC Lab technician
WBFO IT FISO
Khan Younis HC MO
JFO AHO
Saida polyclinic HC pharmacy assistant
Maen HC nurse
Jaresh Camp HC SMO
Rafah HC SMO
JFO M&E officer
Old Askar HC Lab technician
LFO Projects Support officer
Hashimi Comprehensive Clinic (Amman) nurse
Maen HC SSN
Jaresh Camp HC SSN
West Nuseirat HC nurse
Maen HC MO
Maen HC SMO
El Buss Camp HC MO
PA MOH PHC6PH Director
WBFO Admin officer
evaluation of the e-health project

Roche, Paul  
Australian representation officer coord

Saadeh, Anssar  Aqabat Jaber HC MO

Saleh, Ahlam  Jabalia North HC SSN

Saleh, Bader’a  Taybeh HC pharmacist

Salem, Mounir  El Buss Camp HC pharmacy assistant

Salhi, Rana  Saftawi HC MO

Samba, Nadira  WBFO pharmacy officer

Sana’a, Ahmad  Al-Husn Camp HC pharmacy assistant

Sanchez, Felipe  Director of UNRWA affairs WBFO

Sandoka, Abeer  Shu’fat HC Lab technician

Schmale, Mathias  Director of UNRWA affairs LFO

Seebaa, Wafaa  Aqabat Jaber HC pharmacy assistant

Seita, Akihiro  Health Department Director

Shaer, Akram  Maen HC Lab technician

Shaheen, Amal  Nuseirat Middle HC Lab technician

Shahrour, Ahmad  Wadi Alzeineh HC SSN

Shalbak, Murad  Shu’fat HC pharmacy assistant

Shamala, Raja  Khan Younis HC SSN

Shanaa, Fidaa  Hebron HC MO

Shaqra, Mariam  Khan Younis HC nurse

Sharif, Hanan  Al Naser HC pharmacy assistant

Shelbayeh, Khaled Abu-Qader  Old Askar HC SMO

Shraideh, Bassem  Saïda policlinic ACO

Shweiki, Nuba  Shu’fat HC nurse

Tahtamouni, Asad Said  Al-Husn Camp HC MO

Thabet, Ahlam  Nuseirat Middle HC nurse

Ubaid, Mohamed  Rafah HC MO

Ubid, Ghada  Sabra HC Lab technician

Villar-Arribas, Virginia  ERCD Donor Relations Div Chief

Wahoush, Mahmoud  WBFO Disease control officer

Zaatari, Maysoon  Hebron HC SSN