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INFORMATION SYSTEMS DEVELOPMENT AT SELECTED ALBANIAN HOSPITALS

TECHNICAL REPORT

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DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development (USAID) or the United States Government

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ACRONYMS

ADT	Admission / Discharge / Transfer
CPOE	Computerized Physician Order Entry
EEHR	Enabling Equitable Health Reform
EHR	Electronic Health Record
EMR	Electronic Medical Record
GUI	Graphic User Interface
HIPAA	Health Insurance Portability and Accountability Act
HII	Health Insurance Institute
HIS	Hospital Information System
KRH	Korca Regional Hospital
LRH	Lezhe Regional Hospital
LAN	Local Area Network
LIS	Laboratory Information System
M&E	Monitoring and Evaluation
NHS	National Health Service
OS	Operating System
PC	Personal Computer
PDA	Personal Digital Assistant
QGMH	Queen Geraldine Maternity Hospital
ROI	Return on Investment
USAID	United States Agency for International Development

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EXECUTIVE SUMMARY

The purpose of this report is to describe the existing hospital information software and hardware systems at 3 pilot regional hospitals selected by the EEHR project (Queen Geraldine Maternity Hospital, Lezhe Regional Hospital, and Korca Regional Hospital), and to provide a plan and next steps for the development/implementation of a hospital information system at these sites.

We start by giving a brief background on hospital information systems. These systems are proven to improve quality, improve patient safety, and reduce cost. Hospitals can use a variety of configurations and architectures for HIS implementation depending on business needs and budgetary constraints. A very important aspect of HIS is the need for integration and data exchange, which necessitates the use of standardized codes, terminologies and communication schemes.

The three surveyed hospitals showed low to no usage of modern information technology hardware and software. Astraia, an advanced German software for the documentation of obstetrical and gynecological examinations, is used on a server and 42 computers at QGMH, and a server and 19 computers at KRH. While its use at QGMH is modest, it is not yet in use at KRH, due to the very recent introduction.

We offer a set of specific recommendations for next steps for each hospital. A detailed project plan for a full-fledged HIS deployment at KRH is offered as an example at the end of this report for discussion, including proposed timelines spanning 24 months. In addition, we recommend a set of "quick fixes" that can have a visible impact in the short term (4 to 5 months). These include increasing the utilization of Astraia by more on-the-job training and placing more PCs and printers at selected locations, connecting QGRH to the National Civil Registry for preliminary registration of births, building the LAN infrastructure at the hospitals, and deploying an admissions/discharge software module.

1. BACKGROUND ON HOSPITAL INFORMATION SYSTEMS

For the last 30 years, hospital information systems (HIS) have steadily grown in popularity, because they are proven to improve quality, increase patient safety, and reduce cost. At present, nearly every acute care hospital in the United States has some form of HIS, performing at least administrative tasks such as patient billing, accounting, and employee payroll. Increasingly, these systems are getting used at the clinical departments as well. Depending on the size of the hospital, an information system may initially cost from several hundred thousand dollars to tens of millions of dollars.

1.1 OVERVIEW OF SYSTEM ARCHITECTURES

Hospitals can use a variety of configurations for HIS implementations depending on business needs and budgetary constraints. There are two main methods for hosting HISs; either on-site where the computers running the HIS are in the health care facility and administered by their staff; or the HIS is hosted off-site at the vendor's premises or at any cloud-computing services company. In this case, the system is administered by the staff of the cloud computing company and used over the Internet or a dedicated network between the hospital and service provider.

Traditionally, there are four basic system architectures that have been used for hospital information systems. These are: Off-site (remote) processing architecture, Turnkey systems, Centralized processing systems and Client-Server systems.

The above architectures are broad categories. Modifications and combinations of the above also exist, such as the use of client-server technology with centralized processing systems and the addition of wireless technology and personal digital assistants (PDAs) to supplement the core computing functionality. In considering the optimal architecture for a hospital, management needs to take into account factors such as the size of the institution, desired sophistication of the application, IT budget, and anticipated level of user community involvement.

A very important aspect of HIS is the need for integration and the need for communication. Often, different hospital departments have their own stand-alone systems, such as Laboratory Information System (LIS) and pharmacy systems, that do not communicate with each other. In an integrated system, each departmental system communicates with the other systems through either a centralized or decentralized network. In addition, the need to communicate with outside systems including insurance company systems needs to be taken into account. For these reasons, the use of internationally accepted standard codes, terminologies and communication schemes is critical.

1.2 FUNCTIONAL OVERVIEW OF HOSPITAL INFORMATION SYSTEMS

The functionality features of a typical HIS can be broken down into two main categories: Administrative functions and clinical functions.

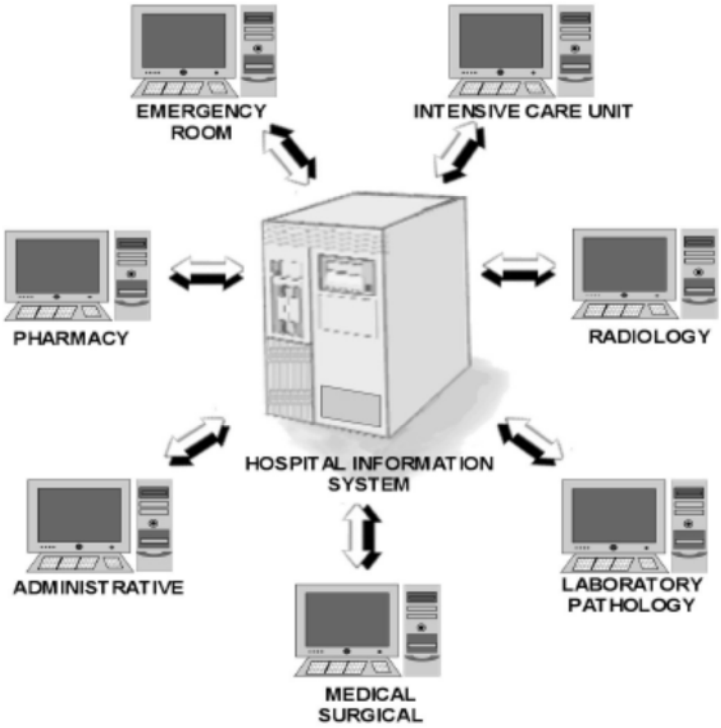
1.2.1 ADMINISTRATIVE FUNCTIONS

Typical functions of an administrative HIS include the following:

- Master Patient Index
- Patient admissions, discharge and transfer
- Admissions scheduling
- Inpatient management
  - Ward monitor
  - Department monitor

- Transfers

FIGURE 1-SCHEMATIC OF AN INTEGRATED HIS



- Outpatient management
  - Waitlist management
  - A&E (ER) management
  - Patient view
- Accounts payable and receivable
- Patient and insurance billing
- Pharmacy inventory
- Internal finance, budgeting and accounting
- Patient census
- Facility maintenance

Billing functions are an area where a hospital can obtain more immediate return on investment (ROI). Often, newly implemented billing systems can provide a hospital with a positive ROI within the first year of active system use.

1.2.2 CLINICAL FUNCTIONS

In contrast to administrative systems, clinical systems deal directly with patient care processes and outcomes. Clinical system sophistication varies widely from hospital to hospital and has the strongest presence in tertiary care centers and teaching hospitals.

Clinical information systems encompass a wide range of features and functions, and modules may include the following:

- Pharmacy information systems, which may include bar coding and drug interaction checking; those functionalities can include:
  - Diagnosis entry

- Independent use of any diagnosis coding system (e.g. ICD 9/10.)
- Procedure capture and coding using standardized codes (e.g. ICD 9CM, OPCS)

- Computerized physician order entry (CPOE) systems allowing clinicians to directly order tests and treatments on line. These systems can also check for selected appropriateness of care parameters. Significant safety improvements have been associated with the use of CPOE systems.
- Other departmental systems such as lab information systems, radiology systems, and intensive care clinical computing.
- Electronic medical record (EMR) systems, which allow patient information such as physician orders, clinical notes, and sometimes radiology images, to be almost entirely computerized, allowing a "paperless" medical institution.
- Reporting modules

1.3 BUILD OR BUY DECISION

Another important consideration when looking at the development of new technological functionality is whether to obtain the system from an outside vendor or build the system using primarily internal staff. Basically, such a build or buy decision depends on the following aspects:

- Availability of internal resources to hire the highly skilled staff needed to create a new system;
- Availability of vendors with proven expertise in the area of technology relevant to the new project; and
- Flexibility of the vendors to customize their products for hospitals with unique needs.

It is always possible to find consultants with highly sophisticated expertise to develop and implement a new HIS system, however, the cost of such consultants is high and could drain the allocated budget for IT. Buying an application off the shelf is often less expensive for sophisticated applications, and there are many vendors willing to increase their market share. A wise approach by hospital senior management is to request information from vendors about their products to be able to evaluate those vendors.

When working with vendors, one should be strategic in price negotiations. One suggestion is to link part of the vendor compensation to the success of the implementation. This puts the vendor partially "at risk" for project success and thus provides additional incentive for vendor cooperation. Additionally, one should not purchase a system or services from the initial bid. It is critical that more than one vendor bids for the project to provide a pricing and negotiation advantage.

There is nothing that states only one vendor can be chosen for a project. Although obtaining everything from one vendor can lead to a more seamless integration and prevent the juggling of multiple vendor relationships, using more than one vendor may in some cases lead to a higher quality end-product. This is known as the "best of breed" approach and is a viable option, in particular for complex projects where a single vendor does not adequately meet user needs

1.4 HOSPITAL INFORMATION SYSTEMS AND LEGAL REQUIREMENTS

A critical feature of any healthcare computer system is that it complies with regulatory requirements. Computer systems, terminals, workstations, servers, and hand-held systems that are fully in communication with each other - including the ability to send data outside the walls of the institution as needed - must ensure the confidentiality of protected health information, which is health information where the person to whom it belongs is identifiable. It is often easier to comply with regulations on protecting patient information electronically as compared to having a paper chart that can be lost or open in front of patients and visitors. Secure password protection must be in place at multiple levels to ensure that access to protected health information is restricted to those who need the information at that time. Appropriate encryption of data is essential for transmission between systems in order to prevent the interception of data.

2. HIS IN SURVEYED HOSPITALS: CURRENT STATUS AND RECOMMENDATIONS

The consultant surveyed three pilot hospitals in order to examine and evaluate the level of implementation of information technology in the daily operation and business processes in those hospitals. The hospitals surveyed are: Korca Regional Hospital, Lezha Regional Hospital, and Queen Geraldine Maternity Hospital. Overall, no hospital information system is in use at any of these hospitals. However, the Astraia software is used at Korca Regional Hospital and Queen Geraldine Hospital. In the following, we provide general observations, a brief background about Astraia, a summary of the findings for each hospital and a set of recommendations for short term and long term interventions.

2.1 GENERAL OBSERVATIONS

One can observe that while hospitals in general have little in terms of comprehensive IT solutions, there is momentum that is slowly building in Albania for moving in the direction of more IT solutions deployed in hospitals. In addition to the standard office applications (such as word processing), more applications are getting into hospitals. For example, the Health Insurance Institute is deploying a costing software module for hospitals to be able to calculate and submit to HII the cost item details of the services provided.

In addition, the eHealth project that is funded by a soft loan from the Austrian government is planned to start in 2012. The project's first priority is to support the capture, integration and exchange of a Nationwide Electronic Health Record (eHR) at all provider levels, covering all regional and district hospitals in Albania, as well as polyclinics and the major national referral hospital in Tirana. The Austrian eHealth project is not focused on the implementation of health information systems within hospitals, but any HIS should plug unto the eHR and communicate with it using the appropriate standards for data exchange and interoperability.

2.2 BRIEF ON ASTRAIA SOFTWARE

Astraia is advanced German software for the documentation of obstetrical and gynecological examinations. It was developed in accordance with quality management procedures that are certified to ISO 13485:2003 standards. It allows collecting patient data as well as report data (including measurements and conclusions) in a templated fashion, guided by input screens. It saves the entered data in a relational database in order to document the course of the therapy. It performs statistical evaluations and creates structured reports (referral letters).

The Astraia installation is very new at the maternity department of Korca Regional Hospital (the maternity department is in a separate building than the main hospital). It runs on a network of 20 computers including a server and a UPS. The vendor is Albanian Business Partners and is currently training the users on using the software. During the consultant's tour of the facility, no user was observed using the software, and the vendor was planning a 10-day on-site training for the staff. It was too early to assess this deployment at KRH.

Astraia is installed on 42 personal computers at Queen Geraldine Maternity Hospital and it seems to have more utilization than at KRH.

Astraia is used in various hospitals and healthcare entities in more than 25 countries around the world. Those include: University hospitals in Germany, Belgium, Switzerland, Spain, Chechnya and

Denmark, medical practices in Austria and medical centers in Holland, France, and Portugal, and NHS Trust hospitals in Great Britain.

2.3 QUEEN GERALDINE MATERNITY HOSPITAL

Queen Geraldine Maternity Hospital does not have a hospital information system. It uses Astraia in a client-server architecture. There is a server and forty two (42) clients distributed in the various rooms, wards and departments of the hospital connected using a high-speed local area network. The technical features and distribution appears in the following tables.

2.3.1 COMPUTER TECHNICAL SPECIFICATIONS

The technical details of the server and clients appear in the following table:

No:	device: PC / US	Operating System	HDD total size: / GB	CPU: / GHz	RAM: / GB	Graphic Resolution	Astraia installed	Mouse/ Keyboard/ Screen/ power Supply
1	Server	Windows Server 2008	C:465 / E: 1.36TB	Intel Xeon E5530 @2.4Ghz	2	1024/768 Standard VGA Matrics Graphic 8Mb	yes	yes
2	Client 1	Windows 7 Home Premium			2	1024/768	yes	yes
3	Client 2	Windows XP Sp3	C:93 / F: 56.2	Intel Dual Core @1.80Ghz	1	1024/76 Intel chipset GMA3000 128 MB	yes	yes
4	Client 3	Windows 7 Professional	C:48.8 / D: 100	Intel Dual Core E2180 @2.0Ghz	2	1024/76 Intel chipset GMA3100 256 MB	yes	yes
5	Client 4	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
6	Client 5	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
7	Client 6	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
8	Client 7	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
9	Client 8	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
10	Client 9	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
11	Client 10	Windows 7	C:100 / D:200	Intel Celeron	2	1024/76 Intel chipset G41	yes	yes

		Professional		450 2.2 GHz		718 MB		
12	Client 11	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
13	Client 12	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
14	Client 13	Windows XP Sp3	C:48.8 / D: 100	Intel Dual Core E2180 @2.0Ghz	2	1024/76 Intel chipset GMA3100 256 MB	yes	yes
15	Client 14	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
16	Client 15	Windows 7 Professional	C:100 / D:200	Intel Celeron 450 2.2 GHz	2	1024/76 Intel chipset G41 718 MB	yes	yes
17	Client 16	Windows 7 Professional	C:48.8 / D: 100	Intel Dual Core E2180 @2.0Ghz	2	1024/76 Intel chipset GMA3100 256 MB	yes	yes
18	Client 17	Windows XP Sp3	C:48.8 / D: 100	Intel Dual Core E2180 @2.0Ghz	2	1024/76 Intel chipset GMA3100 256 MB	yes	yes
19	Client 18	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
20	Client 19	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
21	Client 20	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
22	Client 21	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
23	Client 22	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
24	Client 23	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
25	Client 24	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
26	Client 25	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes

				@3.2Ghz				
27	Client 26	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
28	Client 27	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
29	Client 28	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
30	Client 29	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
31	Client 30	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
32	Client 31	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
33	Client 32	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
34	Client 33	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
35	Client 34	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
36	Client 35	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
37	Client 36	Windows 7 Ultimate	C:195 / D: 270	Intel Dual Core E6700 @3.2Ghz	2	1440/900 Intel G41 Express Chipset 782MB	yes	yes
38	Client 37	Windows XP Sp3	C:58.5 / D:174	Intel Pentium Dual Core E2140 @1.6Ghz	2	1440/900 Intel G33/G31 Express Chipset 256MB	yes	yes
39	Client 38	Windows XP Sp3	C:34.1 / D:42.4	Intel Pentium 3.06Ghz	2	1024/768 Sis 661 64Mb	yes	yes
40	Client 39	Windows XP Sp3	C:37.2	Intel Pentium 3.0 Ghz	2	1280/768 Intel 82915G/GV/910GI 128Mb	yes	yes
41	Client 40	Windows 7 Starter	C:102 / D:195	Dual Core CPU E5500 @ 2.8 Ghz	2	1440/900 GeForce 9300 Ge	yes	yes

42	Client 41	Windows 7 Professional	C: 148	Intel Core 2 Duo E7500 @2.93Ghz	2	1440/900 Intel G41 Express Chipset 798MB	yes	yes
43	Client 42	Windows XP Sp3	C:43.5 / D:31	Intel Pentium 3.0 Ghz	2	1024/768 Intel 946 Gz Express Chipset 256 Mb	yes	yes

The network speed supports 1GB at the server side, and 10/100 Mb for some clients and 10/100/1000 Mb for other clients.

There are six racks and multiple switches existing in:

Server Room : Rack 1

Administration: Rack 2

Gynecology 1: Rack 3

Gynecology 3: Rack 4

Women Center: 1 Rack 5

Obstetrics: Rack 6

2.3.2 COMPUTERS DISTRIBUTION

No:	room No:	Location	device: PC / US	Description:
1	floor 0	Server	Server	Drivers Room
2	floor 1	Administration	Client 1	Director's office
3	floor 1	Administration	Client 2	Meetings Hall
4	floor 0	Gynecology	Client 3	Admission
5	floor 1	Gynecology- Operation hall	Client 4	Nursing
6	floor 2	Gynecology – Abortar	Client 5	Nursing
7	floor 2	Gynecology- Laboratory	Client 6	Laborator -Floor II
8	floor 3	Gynecology- Pathology of the burden	Client 7	Nursing
9	floor 1	Women center	Client 8	Acceptance
10	floor 1	Women center	Client 9	Acceptance
11	floor 1	Women center	Client 10	Eko
12	floor 0	Obstetrics	Client 11	Acceptance
13	floor 1	Obstetrics -	Client 12	Hall
14	floor 2	Obstetrics - Salla e Operacionit	Client 13	Operations Hall
15	floor 2	Obstetrics – Confinement	Client 14	Hall
16	floor 2	Finance 3	Client 15	Finance 3
17	floor 0	Reanimation of women	Client 16	Reanimation of women
18	floor 2	Gynecology- Laboratory CHP	Client 17	Laboratory CHP
19	floor 1	visit room 1	Client 18	Women center
20	floor 1	visit room 2	Client 19	Women center
21	floor 1	visit room 3 – colposcopy	Client 20	Women center
22	floor 1	Eko 2	Client 21	Women center
23	floor 1	Reception	Client 22	Women center
24	floor 2	Operating Room	Client 23	Gynecology

25	floor 4	Doctor Room	Client 24	Gynecology
26	floor 4	Abortar	Client 25	Gynecology
27	floor 1	Molecular Lab	Client 26	Gynecology
28	floor 3	Bacteriological Lab	Client 27	Gynecology
29	floor 1	Kryemamia	Client 28	Administration
30	floor 3	Pediatria	Client 29	Neonatology
31	floor 3	Obstetrics 1	Client 30	Nursing - Dhome
32	floor 1	Obstetrics 2	Client 31	Training Room
33	floor 2	Obstetrics 3	Client 32	Neonatology
34	floor 2	Obstetrics 3	Client 33	Awakening Room
35	floor 3	Obstetrics 3	Client 34	Paralindje
36	floor 3	Obstetrics 2	Client 35	Isolation of women
37	floor 3	Statistics 1	Client 36	Administration
38	floor 1	Deputy Dir of Economics	Client 37	Administration
39	floor 1	Deputy Dir of Quality	Client 38	Administration
40	floor 2	Deputy Medical Director	Client 39	Administration
41	floor 2	Chief Gynecology	Client 40	Building of students
42	floor 1	Chief of Finance	Client 41	Administration
43	floor 1	Finance 2	Client 42	Administration

2.3.3 RECOMMENDATIONS CONCERNING QGMH

- Because the hospital already uses the Astraia software for obstetrics and gynecology, we recommend supporting its utilization through the following:
  - More on-the-job training of staff in order for Astraia to become part of their daily routine.
    - A team of two or three individuals from each department can be formed by a decision from the director of the hospital to be the focal point or the reference for that department. Team members should be computer savvy to assist their colleagues.
  - Purchasing a connection between Astraia and the Ultrasound machine at the hospital (at a cost of less than $3,000) which allows for archiving and accessing the ultrasound images from more locations. This reduces the load on that machine to improve its efficiency, and increases the utilization of Astraia.
  - Purchasing printers and PCs and strategically placing them at locations that face patients to assist in printing reports and documents to give to patients. This reduces the need to write on paper and improves staff and patient satisfaction.
  - Collaboration with the Astraia vendor to remedy some areas that are important for improving M&E indicators, including the use of standardized codes for diagnoses and procedures.
- Initiate a project to electronically connect Queen Geraldine Maternity Hospital to the National Civil Registry so that preliminary registration of newborns at QG is done with the civil registry in a timely fashion. The rationale for this intervention includes:
  - Newborns in Albania are sometimes late in getting registered with the civil registry, which might delay the care provided to newborns including vaccinations, and reduces the quality of M&E indicators.
  - Queen Geraldine Maternity Hospital accounts for a significant number of newborns in Albania, so doing the preliminary registration there is a meaningful project.

The Deputy Minister of Health believes this is an important project to improve the quality of the care and the quality of data. The Director of Queen Geraldine is supportive of this, and so is the Director of the National Civil Registry.

If resources are mobilized quickly, this can be done in about 3 to 4 months, and then later expanded to Korca and Lezha, and later on a national level.

2.4 LEZHA REGIONAL HOSPITAL

On the contrary to the other two hospitals, Lezha Regional Hospital does not have any computer or networking equipment.

2.4.1 RECOMMENDATIONS CONCERNING LRH

- Provide telemedicine equipment, including teletrauma equipment, to connect Lezha Regional Hospital to the Integrated Telemedicine and e-Health Program of Albania. The rationale includes:
  - This connection allows sharing information and experiences with Lezha Regional Hospital to improve the staff skills and the care provided to patients.
  - Telemedicine and especially teletrauma can be life-saving for patients at the somewhat remote Lezha site, where minutes can sometimes make the difference between life and death.
  - Given the previous investments already made by USAID and partners in the telemedicine program, connecting Lezha Regional Hospital can be done at a minimal cost because of leveraging the previous investments.
- Provide basic Local Area Network (LAN) infrastructure to the hospital including cables, switches, routers, and a server. We suggest contracting with a vendor to do this.
- Initiate a two-pronged approach regarding a hospital information system:
  - The first is short term and focuses on the admissions and discharge module of a hospital information system. This module should be integrated with the existing costing software that the Health Insurance Institute (HII) is rolling out to Albanian hospitals. Furthermore, we recommend that this software module be part of a package of interventions that focus on the touch points between the hospital and patients. So in addition to a software module for patient admission and discharge, the package includes modernizing the reception desk and furniture, introducing a carefully designed signage system throughout the facility to improve user friendliness, and introducing nametags for all staff members. These interventions can be done relatively quickly and have a visible impact.
  - The second is longer term and focuses on a full-fledged hospital information system. The details of this approach including a proposed project plan are available in a separate report.

2.5 KORCA REGIONAL HOSPITAL

Korca Regional Hospital has about 10 personal computers for administrative issues, in addition to the Astraia software at the maternity building (which is in a separate building). There is a server and nineteen (19) clients distributed in the various rooms, wards and departments of the maternity building connected using a high-speed local area network. The technical features and distribution appears in the following tables

2.5.1 COMPUTER TECHNICAL SPECIFICATIONS

Server Computer	
CPU	Intel Core i3 550 @ 3.2 Ghz
HD	C:97.5 / D:600 GB
RAM	8 GB
Operating System	Windows Server 2008 Standard R2
Graphic Resolution	1280 x 1024 Matrox G200eW
Screen	HP LE1901w
Mouse/Keyboard	Standard
Power Supply	Standard

Astraia (hospital software)	Installed
Location	Special Server Room in Floor 0

Client Computers	
CPU	Intel Celeron G530 @2.4 Ghz
HD	C:195 / D:270 GB
RAM	2 GB
Operating System	Windows 7 Ultimate
Graphic Resolution	1440 x 900 / 784 Mb Intel Graphics
Screen	HP LE1901w
Mouse/Keyboard	Standard
Power Supply	Standard
Astraia (hospital software)	Installed
Location	According to Distribution Table

The local area network supports data transfer rates of 10/100/100Mb, and network equipment are located in the server room. There is one rack and a switch of 24 connection points.

2.5.2 COMPUTER DISTRIBUTION

The following table describes the distribution of the server and client computers according to rooms and floors in Korca Regional Hospital maternity building.

No:	room No:	device: C / US	Description:
1	Floor 0	Server	Server Room
2	Floor 0	Client 1	Obstetrics Admission
3	Floor 0	Client 2	Gynecology Admission
4	Floor 0	Client 3	Reception
5	Floor 0	Client 4	Neonatology Admission
6	Floor 0	Client 5	Echography Room
7	Floor 0	Client 6	Files room
8	Floor 0	Client 7	Director Office
9	Floor 0	Client 8	Meetings Hall
10	Floor 0	Client 9	Laboratory
11	Floor 0	Client 10	Isolation of women
12	Floor 1	Client 11	Doctor room
13	Floor 1	Client 12	Neonatology Nursing
14	Floor 1	Client 13	Kryemami Neonatologji
15	Floor 1	Client 14	Obstetrics Nursing
16	Floor 1	Client 15	Obstetrics Nursing
17	Floor 1	Client 16	Nursing – Operations room
18	Floor 2	Client 17	Dcotors Room
19	Floor 2	Client 18	Doctors room - Guard
20	Floor 2	Client 19	Abortari

2.5.3 RECOMMENDATIONS CONCERNING KRH

- Provide basic Local Area Network (LAN) infrastructure to the hospital including cables, switches, routers, and a server. We suggest contracting with a vendor to do this.

- Because the hospital already has recently installed the Astraia software for obstetrics and gynecology, we recommend supporting its use through the following:
  - More on-the-job training of staff in order for Astraia to become part of their daily routine.
  - A team of two or three individuals from each department can be formed by a decision from the director of the hospital to be the focal point or the reference for that department. Team members should be computer savvy to assist their colleagues.
  - Purchasing a connection between Astraia and the Ultrasound machine at the hospital (at a cost of less than $3,000) which allows for archiving and accessing the ultrasound images from more locations. This reduces the load on that machine to improve its efficiency, and increases the utilization of Astraia.
  - Purchasing printers and PCs and strategically placing them at locations that face patients to assist in printing reports and documents to give to patients. This reduces the need to write on paper and improves staff and patient satisfaction.
  - Collaboration with the Astraia vendor to remedy some areas that are important for improving M&E indicators, including the use of standardized codes for diagnoses and procedures.
  - After the interface between Queen Geraldine and the Civil Registry is properly developed and tested for preliminary birth registration, expand that interface to Korca Regional Hospital.
- Initiate a two-pronged approach regarding a hospital information system:
  - The first is short term and focuses on the admissions and discharge module of a hospital information system. This module should be integrated with the existing costing software that the Health Insurance Institute (HII) is rolling out to Albanian hospitals. Furthermore, we recommend that this software module be part of a package of interventions that focus on the touch points between the hospital and patients. So in addition to a software module for patient admission and discharge, the package includes modernizing the reception desk and furniture, introducing a carefully designed signage system throughout the facility to improve user friendliness, and introducing nametags for all staff members. These interventions can be done relatively quickly and have a visible impact.
  - The second is longer term and focuses on a full-fledged hospital information system. The details of this approach including a proposed project plan are available in a separate report.

3. PROPOSED HIS PROJECT PLAN FOR KRH – FOR DISCUSSION

In order to facilitate discussion and to clarify the process, we take below Korca Regional Hospital as an example and expand its phases of the HIS implementation as recommended in this report.

The KRH HIS implementation project has five phases, each with multiple stages and steps covering the project plan aspect, staring from expressing the need and preparation of requirements, through implementation, deployment and monitoring, and ending with continuous operation and maintenance.

In order to have rapid deployment of some HIS components and prepare the necessary infrastructure for it, we added a Quick Start Phase at the beginning. We present the details below.

3.1 QUICK START PHASE

It consists of the following stages and steps

3.1.1 SETUP BASIC LAN INFRASTRUCTURE

- Clarify scope
- Obtain LAN server
- Obtain routers and switches
- Obtain cabins, cables, and connectors

3.1.2 ENHANCE ASTRAIA UTILIZATION

- Clarify scope
- Printers procurement and proper placement
- On-the-job-training for staff

3.1.3 DEPLOY ADMISSIONS/DISCHARGE MODULE

- Clarify scope
- Contracting and procurement
- Customization and integration with HII costing software
- Deployment

3.2 PLANNING PHASE

It consists of the following stages and steps

3.2.1 PREPARING THE BOOK OF TECHNICAL CONDITIONS STAGE

- Performing the necessary system analysis and defining user requirements
- Describing the required system modules and functions (administrative and clinical)
- Specifying the required architecture
- Defining the needed system customization
- Performing training needs analysis and establishing training requirements
- Auditing, amending and finalizing the book of conditions by an independent consultant.
- The book of conditions must be prepared according the laws and regulations governing the

procurement process for government entities in Albania.

3.2.2 PROPOSAL STAGE

- Setting the general, legal and formal conditions for proposals
- Preparing the call-for-proposal announcement form
- Calling for proposals
- Pooling proposals
- Closing the proposal receiving period
- Sorting the proposals and cross-checking them against the general, legal and formal conditions.
- Disregarding the proposals that do not meet the pre-set general and formal conditions

3.2.3 EVALUATION STAGE

- Forming the technical and financial evaluation committee
- Opening the proposals
- Evaluating the conformity of the proposals against the technical requirements set forth in the book of conditions
- Disregarding the proposals that do not fulfill all of the technical requirements of the book of conditions
- Evaluating the financial proposal for the technically successful proposals
- Scoring the proposals technically and financially
- Selecting the best or top three proposals (you need at least three successful bidders)

3.2.4 NEGOTIATION STAGE

- Contacting the selected bidders
- Administering a brief session for each bidder where he/she present their view of the project and the work plan towards realization of the results and the expected timeline.
- IF NEEDED and BASED ON AVALIABLE BUDGET Ask each bidder independently to make a final price break
- Select the successful bidder and inform him and inform the other two bidders of the result.

3.2.5 CONTRACTING STAGE

- Prepare contract *(If not prepared previously during the first stage with the book of conditions)*
- Sign contract with the selected bidder *(will be called from now the contractor*)

3.2.6 PROJECT PLAN STAGE

- Ask the contractor to present formally the work plan for the HIS project
- Agree and co-sign the work plan along with any other required documents
- Identifying the counterpart work teams from both sides and back-stopping teams, and provide them with a briefing about the work plan
- Administering an introductory session / presentation for all the hospital staff about the to-be HIS.

3.3 IMPLEMENTATION PHASE

It consists of the following stages and steps

3.3.1 PEOPLE & PROCESS STAGE

- Business process reengineering step:

- This step requires mapping of the current business processes in the hospital in the as-is form, then doing the mapping of these processes in the to-be form after the HIS is in place.
- Change management step:
- This step requires the implementation of the necessary change management approaches by the contractor and the counterpart team to insure smooth transition from the old system to the new system.
- Benefit realization plan step:
- The benefit realization step involves the publicizing of the benefits of the HIS system and how much it contributes to increasing efficiency of wok and all other benefits, to get the buy-in from hospital staff and patients as well.
- Training step:
- This step implies the administration of multiple training sessions for the hospital staff who will be using the HIS, according to the training needs analysis and requirements set forth in the book of conditions. Training of trainer sessions might be required to prepare coaches and trainers in the hospital who are able to train new employees.

3.3.2 SYSTEM STAGE

- Setting up the necessary computer hardware, and network infrastructure including high-speed Internet connections.
- Installing the OS and core HIS Software
- Performing the needed customization and changes
- Interfacing with the national EHR system
- Technical testing and troubleshooting
- Testing the functionality of the required modules as per the user requirements set forth in the book of conditions.

3.3.3 PROJECT STAGE

- Project management and documentation

3.4 DEPLOYMENT PHASE

It consists of the following stages and steps

3.4.1 USAGE AND TROUBLESHOOTING STAGE

- Deploying the Hospital Information System for pilot usage
- Reviewing all system generated outputs from all functional modules, whether printed or screen-viewed for integrity and comparison with original paper-based docs.
- Reporting any issues and /or technical problems resulting from the system itself or generated by user-errors.

3.4.2 ADJUSTMENT STAGE

- Making the necessary technical adjustments and re-customization to the HIS by the contractor and re-testing
- Re-emphasizing some training sessions for admin and/or clinical staff deemed necessary to override certain user errors.

3.5 MONITORING AND EVALUATION PHASE

It consists of the following stages and steps

3.5.1 PROJECT REVIEW STAGE

- Reviewing all activities of the project according to the work plan
- Identifying any missing activities and /or shifting and /or rearrangement in the schedules
- Setting a list of all discrepancies and discussing with the contractor and the independent consultant

3.5.2 BENEFIT REALIZATION REVIEW STAGE

- Reviewing the expected benefits of the HIS and comparing it to the expected benefits set forth in a previous stage
- Marking those benefits that were not achieved and/or still need enhancing the functionality of the HIS

3.5.3 OPERATION AND MAINTENANCE STAGE

- Continuous operation of the HIS
- Setting and agreeing on a periodical software and hardware maintenance fixed schedule during the warranty year(s)
- Preparing an annual maintenance contract form: this shall be agreed on and signed by the contractor and will be effective after the warranty period is over.

3.6 KRH PROJECT PLAN INCLUDING TIMELINES

We present below the draft plan with initial timelines for KRH HIS deployment as an example for discussion.

				YEAR 1												YEAR 2											
HIS PROJECT PLAN			m0	m1	m2	m3	m4	m5	m6	m7	m8	m9	m10	m11	m12	m13	m14	m15	m16	m17	m18	m19	m20	m21	m22	m23	m24
Phase	Stage	Step																									
Quick Start Phase	Setup basic LAN infrastructure	Clarify scope																									
		LAN server																									
		Routers/Switches																									
		Cables/Connectors and Cabinets																									
	Enhance Astraia untilization	Clarify scope																									
		Printers procuremnt and proper placement																									
		On-the-job training																									
	Deploy Admissions/Discharge module	Clarify scope																									
		Contracting and procurement																									
		Customization and integration with HII costing software																									
		Deployment																									
Planning Phase	Preparing the book of conditions stage	Performing the necessary system analysis and defining user requirements																									
		Describing the required system modules and functions (administrative and clinical)																									
		Specifying the required architecture																									
		Defining the needed customization																									
		Training needs analysis and requirements																									
		Auditing and amending the book of conditions by an independent consultant																									
	Proposal stage	Setting the general, legal and formal conditions for proposals																									
		Preparing the call-for-proposal announcement form																									
		Calling for proposals																									
		Pooling proposals																									
		Closing the proposal receiving period																									
		Sorting the proposals and cross-checking them against the general, legal and formal conditions.																									
		Disregarding the proposals that do not meet the pre-set general and formal conditions																									
	Evaluation stage	Forming the technical and financial evaluation committee																									
		Opening the proposals																									
		Evaluating the conformity of the proposals against the techncial requirements set forth in the book of conditions																									
		Disregarding the proposals that do not fulfill all of the technical requirements of the book of conditions																									
		Evaluating the financial proposal for the technically successful proposals																									
		Scoring the proposals technically and financially																									
		Selecting the best or top three proposals (at least three successful bidders are needed)																									
	Negotiation stage	Contacting the selected bidders																									
		Administering a brief session for each bidder where he/she present their view of the project and the work plan towards realization of the results and the expected timeline.																									
		If needed, ask each bidder independently to make a final price break																									
		Select the successful bidder, and inform all bidders of the result																									
	Contracting stage	Prepare contract ***(If not prepared previously during the first stage with the book of conditions)***																									
		Sign contract with the selected bidder (will be called from now the contractor)																									

	Project plan stage	Ask the contractor to present formally the work plan for the HIS project
		Agree and co-sign the work plan along with any other required documents
		Identifying the counterpart work teams from both sides and back-stopping teams, and provide them with a briefing about the work plan
		Administering an introductory session / presentation for all the hospital staff about the to-be HIS
Implementation Phase	People & Process Stage	Business process reengineering (mapping as-is and to-be processes)
		Implementing change management approaches
		Benefit realization plan: planning for publicizing the benefits of the HIS
		Adminsitering various training sessions for hospital staff
	System Stage	Setting up the necessary computer hardware, and network infrastructure including high-speed Internet connections
		Installing the OS and core HIS Software
		Performing the needed customization and changes
		Interfacing with the national EHR system
		Technical testing and troubleshooting
		Testing the functionality of the required modules as per the user requirements set forth in the book of conditions
	Project Stage	Project management and documentation
Deployment Phase	Usage and troubleshooting stage	Deploying the Hospital Information System for pilot usage
		Reviewing all system generated outputs from all functional modules, whether printed or screen-viewed for integrity and comparison with original paper-based docs
		Reporting any issues and /or technical problems resulting from the system itself or generated by user errors
	Adjustment stage	Making the necessary technical adjustments and re-customization to the HIS by the contractor and re-testing
		Re-emphasizing some training sessions for admin and/or clinical staff deemed necessary to override certain gaps
Monitoring and Evaluation Phase	Project review stage	Reviewing all activities of the project according to the work plan
		Identifying any missing activities and /or shifting and /or rearrangement in the schedules
		Setting a list of all discrepancies and discussing with the contractor
	Benefit realization review stage	Reviewing the expected benefits of the HIS and comparing it to the expected benefits set forth in a previous stage
		Marking those benefits that were not achieved and/or still need enhancing
	Operation and maintenance stage	Continuous operation of the HIS
		Setting and agreeing on a periodical software and hardware maintenance fixed schedule during the warranty year(s)
		Preparing an annual maintenance contract form: this shall be agreed on and signed by the contractor and will be effective after the warranty period is over.

ANNEX A: BIBLIOGRAPHY

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