

New Millennium Hospital Management Information System: Experience of the National Cancer Institute – Cairo University

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Abstract

The National Cancer Institute-Cairo University (NCI) is a leading cancer center in the Middle East and Africa. It serves more than 15,000 new cases and more than 250,000 patient visit every year. The implementation of its Hospital Management Information System was completed and the system was operational in 1992. Although different modules were added to the HMIS, the core of the system has never been changed or updated. NCI evaluated its current system. NCI also evaluated the modern tools in databases and programming. NCI came to the conclusion that a new HMIS need to be installed. The needs of NCI staff were analyzed with consideration to budget issues and the limitations of a developing country. Different hardware, networking and software issues had to be considered in the updating. Arabization and customization were main factors in decision making.

Keywords:

Egypt; Arabic Language; Hospital Management Information Systems; Medical Informatics; Cancer

Introduction

The National Cancer Institute-Cairo University (NCI) is a leading Cancer center in the Middle East and Africa. It has been in operation since 1970. It serves yearly more than 15,000 new Cancer cases and more than 250,000 patient visit. NCI serves as a cancer treating hospital, a teaching hospital specialized in cancer as well as a research center. About 70% of NCI's patients are treated free of charge, while the rest are treated at almost cost price. NCI approach to treatment is a multidisciplinary approach. NCI carries also the responsibility of professional, patient and public education

HMIS

The implementation of its Hospital Management Information System (HMIS) was completed and the system

was running in 1992 through a grant from United Nations Development Program (UNDP). It was at the time the largest and most comprehensive medically oriented HMIS in Egypt.

The Old System

The HMIS system of NCI is composed of hardware, network and software.

Regarding **hardware** the system is composed of about 120 PCs. They used to be of limited power by the standards of year 2000, ranging from 386 and 486 CPUs with few Pentium I. Their ram did not exceed 8 MB on any of the work stations. The server was a Pentium with 32 MB ram and 2 hard disks each 6 GB, and it was a 486 50MHz for years. [1]

The **network** was only a 10 MB/sec network with thick Ethernet cable as the back bone and connected to several hubs through transceivers. Hubs capacity ranged from 8-24 port. From the hubs to each work station ran a twisted pair cable (UTP) with a limited allowable distance of 100 meters.

The **software** system is based on the USA-VA Decentralized hospital computer programs (DHCP), recently named VISTA. VISTA is a comprehensive Hospital management system that is in part available free of charge through the Freedom of Information Act of the USA[2]. It is composed of several administrative, clinical and financial applications. The software have been customized and translated in part into the Arabic language to fit the needs of NCI. The customization and Arabization was done by an in-house development team. [2,3]

Role of HMIS

The role of a HMIS is to support different hospital activities in the clinical, administrative, and financial aspects. It should be also a base for research in research hospitals. [4]

Needs for Change

In order to fulfill these goals a HMIS needs regular updating and frequent modifications and tuning. Modern hospitals change significantly every few years, due to the introduction and use of new equipment, change in the standard management of diseases and the introduction of modern procedures. [4]

Moreover, hardware and networks technology have developed greatly in the last decade. Although it is very difficult and uneconomical for a hospital to try and keep up with the race in hardware and network development, it is very important to update its system every few years.

Changes in economics pricing and budget are also reflected on hospital operations and management, which in return is reflected on the HMIS.

Another important factor is that the drop in prices of computer and network components makes it sometimes more economical to replace old expensive technologies with cheap and up to date ones, than to do maintenance for old equipment. [5]

Objectives

NCI is installing the HMIS with the following objectives :

- To improve patient care,
- To support research.
- To support and improve hospital management.

Software Components

The medical software will be based on VA-VISTA, running under Cache on an NT server, while the administrative and financial applications will be running under MS NT using SQL server.

The NCI HMIS is composed of the following modules:

- Patient registration, Admission, Discharge and Transfer system (ADT),
- Scheduling system for outpatients and services.
- Surgery module which is an operating room management systems that also handles anesthesia and non-operating room procedures.
- Laboratory system that covers Chemistry, Hematology, Blood Banking, Anatomic Pathology and Cytology.
- Radiology system that covers conventional, Ultrasonography, CT scans as well as Nuclear Medicine.
- Outpatient and Inpatient Pharmacy systems.
- Patient billing system

- Imaging System (PACS system) that covers images, slides and films in the different departments of the hospital. This includes radiology, radiotherapy, pathology, endoscopies and others [6]
- Nursing System
- Equipment & Preventive Maintenance System
- Other Financial & Administrative Systems e.g. Payroll, Personnel, General Ledger, Fixed Assets, Inventory,

Hardware

The capacity of the HMIS will be increased to accommodate the growing demand.

Servers

One M server with a machine acting as a shadow will act as the main HMIS servers. They will be running under operating system MS NT with Arabic support.

One imaging server

One internet server

Workstations

The number of workstations will be increased. 250 P III 733 MHz, with 64 MB RAM and 10GB hard disks with multimedia will be installed in the project.

Networking

The new network will totally replace the old one. A series of Cisco Switches is being used to distribute the lines to the hospital. From the switches to each workstation UTP cables are used. On the other hand, Fiber Optic cables connect the switches. One main switch act as a master switch and is located in the main server room.

For an initial period the new network and the old one will work in parallel.

The ability to configure network components, extend the network and do simple maintenance in-house was an important factor in the decision. Whether this can be done remains to be proved.

Developing Countries Issues

Budget

Budgeting for HHMIS in a developing country is a very critical task. Many decision makers still do not appreciate that role that a HMIS can play in the hospital. The rapid change in computer pricing and specifications makes the job much more difficult. [7]

Outdated Legislation

Some agencies on the local, sub-national or even on the national level might not approve of electronic documents or printouts from computers as accepted documents. This includes medical, financial and administrative documents. Developing countries need an immediate change in legislation to accommodate and formulate the use of computerized systems on all levels of care.

Arabic Language

The ability to use the Arabic language is crucial to the system and to the development of any HMIS in Egypt and many countries of the Middle East. In Egypt, Medicine is practiced in the English language with all drug names, prescriptions, diagnosis, medical reports and health summaries ...etc in English. Moreover, Arabic is also needed for names, including patients names, physician names and other staff members names. It is also used for printed instructions to the patient. It includes medical, pharmaceutical, preparation and medications instructions.

Arabic must also be used for nursing patient care assignments for the junior nurses and assistants.

A big problem is the choice of the type of Arabic to be used. This is a problem because up until now there has been no single Arabic standard. Unicode Arabic standard was used for this project. This will allow compatibility with different MS products.

Arabic language has some special considerations. First the Arabic letters change shape with the change of the position of the letter in the word. It is different if it is in the beginning, middle or at the end of the word. Another special characteristic is that it is written from right to left and not from left to right as most western languages. It shares these characters with the Persian, Urdu and Hebrew. So the screens need to be oriented right to left as well.

On the DOS level this was handled by a memory resident program (TSR) . In windows. this needs to be handled on the operating system level.

Maintenance

One of the problems in developing countries is maintenance of the hardware and software. The cost and the source of the money needed for maintenance should be evaluated and defined from the start. Many projects have almost collapsed due to lack of funds for continuation.

Conclusion

- HMIS is important for hospitals in developing countries.

- The development, customization, translations and maintenance should be done locally by local manpower with suitable and continuous training.
- HMIS are dynamic. They require updating, tuning and additions continuously.
- HMIS need to be affordable for many countries.
- HMIS should include indicators for measuring the quality of system operations[8].

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