

B PAPERLESS CLINICS

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By

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A project submitted in partial fulfillment of the  
requirements for the degree of

M.S. Computer Science

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**LEBANESE AMERICAN UNIVERSITY**

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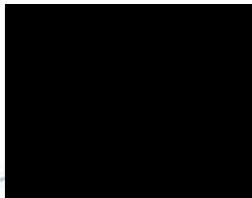
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To My parents  
Diana

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## ABSTRACT

Throughout history medical fields are an important area for research and application and because of its criticality paperwork accounts for a significant time. Our role as IT developers is to offer the best technologies to help improving the overall work for both the doctors and all other employees. With the growth of communication ways such as the Internet and the intranets doctors can consult other doctors and share the latest information in just minutes. Patients also can access their medical records securely, take appointments and view doctors' notes, etc. Nodaway, Polyclinics are considered a hot topic. This paper explores the importance of introducing paperless office for doctors and nurses and its ability to improve their work and accuracy, reduce the space of files in the office, allows a better and safer communication. Moreover, it includes steps from the first visit of the patient and throughout his life, beginning with the registration, taking appointments and following up the patient. Furthermore, this paper introduces a small mobile application that helps the doctor viewing his appointment and accessing his patient's databases wherever he is.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 What is a paperless clinic?

A paperless clinic is an Implementation of software that facilitates the work of doctors and all other employees in clinics reducing filling forms and applications for patients and allowing a better retrieval for patient's records from databases

#### 1.2 Scope of the Project

What are paperless Clinic benefits?

Paperless clinic benefits are the data collected from and about the individual patient, medical record will be documented coordinated and integrated for all the activities throughout patient's life, data will be used in improvement in information management, consideration for timeliness, accuracy, security/confidentiality, access, efficiency, collaboration, integrity of data will be factors in the overall management of information, redesign of important information and related processes to improve efficiencies will be an ongoing process and greater collaboration and information sharing to enhance patient care will be a primary focus because sharing information throughout intranets is much easier among doctors than using papers and old ways, statistics for international communities and for doctors will be much easier because it will be done automatically by producing reports at the end of the day, the end of the week, the month and the year, patient information will be available for hospitals, clinics, faculties ...

"It's common knowledge that health care paperwork accounts for a significant percentage of the high cost of health care. As a result, new paperless, computer-based solutions that enable providers to collect, store, and securely transmit patient information are becoming increasingly popular as a means to cut costs and improve patient care. In fact, new government regulations, including the Health Insurance Portability and Accountability now mandate that all health care providers move to such systems by 2004."[1]

As the field of health information management is constantly changing with improvements in technology, and as the services of the facility shift to meet the needs of the community, it is understood that this technology will achieve compliance over time, with revisions as appropriate to changes in the healthcare environment. Moreover, the system has to meet the standards of the international health standards by offering additive databases (databases can only be updated, deleting information is not allowed).

### 1.3 The Environment of the system:

The system can be divided into views, allowing each employee to view what he needs to, to accomplish his job; mainly it will be separated into three parts.

- View for the nurses
- View for the doctors
- Statistics reports

What do we need to achieve the paperless clinic?

- Taking into consideration that doctors and nurses will have limited knowledge in computer thus reducing the complexity of the system
- Analyze the requirements asked by doctors and nurses carefully
- Research hospital systems
- Implement a tool that fulfills doctor's needs without complicating their work
- Design a friendly menu to use

This application will reduce the manual effort done in filling forms and filing leading into a better organization and a better retrieval of data. It will help doctors in having all the data in drop down menus, patient's history and doctor's notes will appear with just a simple click, statistics will be produced at the end of every month helping the doctor improving his clinic and last but not least this system can be implemented in an environment where many clinics are grouped in one apartment allowing each clinic to have its own database and its own functionality.

“Moorefield Eye Hospital, one of the world's leading centers for eye health, is spread over 11 sites and employs more than 1,000 staff. Moorefield uses leading-edge IT, such as Gigabit Ethernet, to meet the needs of thousands of end-users: this range from researchers at its Institute of Ophthalmology, to patients using the online appointment system. The IT staff is always looking to do more, too: a current project is trailing a completely paperless clinic.”[4]

## CHAPTER 2

### REGISTRATION AND MAINTENANCE

In this chapter we will discuss the design of the system and how it should be used both by the nurse/secretary or the doctor.

#### 2.1 The search engine

This is the first form used by the secretary or the nurse to check out whether the patient has a name in the database or he/she should register him by taking the required information taking into account that some patients will forget that they have visited the clinic long time ago, and that they have a medical record in the clinics databases.

The search can be done in many criteria:

1. First name
2. Last name
3. ID number
4. Surname
5. Middle name

And the most important is that search can be done using “soundex” which is a very useful feature in searching engines especially if we are searching by name because names can be written in many different ways for example if we are searching the name “Mohamed” the user can write it in many ways such as “Mohammad” or “Mohammed” and the engine will not find it but with this simple feature it will try all these combinations. Moreover, this clinic deals with female patient and sometimes women give their husband last name, instead of trying to fill this name in two boxes the system will search for women’s last name and their husband’s last name showing the patient’s data allowing the secretary to reserve an appointment or asking for patient’s data(if name is not found).

Figure 1 shows the basic search engine with the two check boxes that allows the nurse/secretary to use the “Soundex” in the search or to use the “merge in one name” option that searches for the family name and the husband’s family name.

The screenshot displays the 'Patient Search Engine' interface. At the top, there is a 'MESSAGING' section with 'CLOSE', 'ENABLE', and 'CHAT BOARD' buttons. Below this is a 'MESSAGE' input field and a 'TO' dropdown menu set to 'NVD Group -', with a 'SEND MESSAGE' button. The date 'Wednesday Feb 28, 07' is shown in the top right corner.

The main header area includes 'DR. TOUFIC EID'S CLINIC' and a navigation bar with buttons for 'PDM', 'APPOINTMENT', 'REMINDER', and 'MAM'. A sidebar on the left lists various system functions: 'MAIN PAGE', 'PATIENT ADMISSION', 'APPOINTMENT', 'FINANCIAL', 'REMINDER', 'PRIVATE CALENDAR', 'MED RECORD MANAGER', 'REPORTS', and 'SYSTEM SETUP'.

The search form is titled 'Patient Search Engine' and includes a 'SEARCH' button and a 'CANCEL' button. Below the search bar are options for '<< BACK', 'SIMPLE SEARCH', and 'ADVANCED SEARCH'. The 'SIMPLE SEARCH ENGINE' section contains the following fields and options:

- First Name**: Input field
- Father Name**: Input field
- Surname**: Input field
- Maiden Name**: Input field
- Patient Name**: Input field
- Using Soundex**
- Merge in one Name**
- Patient Medical Number**: Input field
- Patient Phone Number**: Input field (with '(Home)' label)
- Cellular Number**: Input field

At the bottom of the page, there is a 'QUICK SEARCH' section with a 'PATIENT ID' dropdown and a 'FOR' input field, followed by a 'GO' button. The footer contains the text 'Powered By NVD Group', 'DR. TOUFIC EID'S CLINIC Specialty Clinics Center, Suite 7B, Maamari St, facing Gefinor Center, Hamra BEIRUT - LEBANON', and links for 'Change Password', 'Clinic Switcher', and 'Administration Area'. The bottom-most footer includes 'Copyright © 2006-2007 Smart Clinics (version 1.0), All rights reserved. Privacy Policy' and logos for 'net(2.0)', 'A', and 'Jbx'.

Figure 1: Search From

## 2.2 Patient registration/Fast registration:

If the client has no record in the database, the nurse/secretary has to ask him for the required information to fill in the registration forms which are very important for the clinic use and the doctors. Those forms have to be filled by patients full names, address, phone numbers, date of birth, nationality ... and there is a box where the secretary/nurse has to select a reference which explains if the patient is sent from another doctor or from AUH and this dropdown menu can be customized to accept new names by pressing on the + right next to it. If the patient wants to add his picture to the database he can bring a small picture that will be scanned and uploaded to the system which will test the dimension of it ensuring that it is not very large. "Care providers in today's managed care environment are always looking for creative ways to improve staff utilization and improve the quality of care they provide." [6] When the nurse/secretary fills in the data the system will create a unique ID number for the patient which will be its primary key in the database, this number is formed from the year plus an auto number ex: 90-002. The system will only show the auto number on the screen, if the doctor wants to accept a patient by a specific medical number he has the option to do this by selecting a radio button "admission by a specific medical number" a text box will automatically open asking the nurse/secretary to enter the number and if the number already exists the system will refuse it and ask for another number. After filling the first form the nurse/secretary will click next to go to another similar pages, one of the registration forms that has to be filled is the contact information in case the doctor wants to call the patient's relatives for an emergency case, the nurse/secretary will ask the patient for the preferred contact way and for the address and phone numbers of the related people. And finally a small text box can be filled with any notes the doctor or the nurse/secretary which to add. After entering all the information in the forms the nurse/secretary will click on the register button to add all the info to the database and create the auto number. "Paperless office can enhance the quality of care that a physician practice delivers while also offering an array of other benefits." [8]

Patient fast registration is created for patient who are busy or those who want to take an appointment very quickly as shown in Figure2. This form allows the secretary/nurse to create a temp ID for the patient that will be fixed later if the patient came to see the doctor, this form asks only for the most important information such as the name, last name, date of birth, and gender.

The screenshot shows a web-based medical application interface. At the top, there is a 'MESSAGING' section with 'CLOSE', 'ENABLE', and 'CHAT BOARD' buttons. Below this is a 'MESSAGE' input field and a 'TO' dropdown menu set to 'NVD Group -', with a 'SEND MESSAGE' button. The main header area displays 'DR. TOUFIC EID'S CLINIC' and the date 'Wednesday Feb 28, 07'. A navigation bar includes 'SMART CLINICS DIGITAL SYSTEM' and buttons for 'PIM', 'APPOINTMENT', 'RECORDS', and 'MIM'. A left-hand menu lists various system functions like 'MAIN PAGE', 'PATIENT ADMISSION', 'APPOINTMENT', 'FINANCIAL', 'REMINDER', 'PRIVATE CALENDAR', 'MED RECORD MANAGER', 'REPORTS', and 'SYSTEM SETUP'. The central content area is titled 'PATIENT FAST REGISTRATION' and includes a status bar with 'PRG002 | TEID [1] | LOGOUT' and icons. Three radio buttons are present: 'Auto Generate Patient Medical Number' (selected), 'Admission By Specific Medical Number', and 'Generate Temp Patient ID'. The form fields include: 'Title\*' (dropdown menu with 'Ms.' selected), 'Patient Name' (split into 'First Name\*', 'Father Name', 'Surname\*', and 'Maiden Name' text boxes), 'Date of Birth' (text box with a calendar icon), and 'Gender\*' (radio buttons for 'FEMALE' and 'MALE'). At the bottom of the form are 'REGISTER' and 'CANCEL' buttons. Below the form is a 'SMART CLINICS' section with a 'QUICK SEARCH' area containing a 'PATIENT ID' dropdown, a 'FOR' text box, and a 'GO' button. The footer contains 'Powered By NVD Group', the clinic name 'DR. TOUFIC EID'S CLINIC', its address 'Specialty Clinics Center, Suite 7B, Maamari St, facing Gefinor Center, Hamra BEIRUT - LEBANON', and links for 'Change Password', 'Clinic Switcher', and 'Administration Area'.

Figure 2: Patient Fast Registration

### 2.3 Patient maintenance form

This form is very critical in medical fields and after some research, it turns out that medical data should be updated in separation from the patients name and this is an important rule that protects data from being manipulated and transferring some patients' file into another one thus the system will give two views for maintenance.

“Under the new setup, doctors dictate the specifics of their visits with patients and then transcriptions type up the notes and put them into the patient's digital file. Insurance cards that were once copied and re-copied for each new patient are scanned into the clinic's database and placed in the patient's electronic file. The clinic put flat-screen monitors in each examination room. It's a solution to a problem that is inherent in any medical practice of an appreciable size. Keeping and tracking patient records is a cumbersome process filled with plenty of wasted time, he says.”[2]

- Data maintenance
- Name maintenance

As you can see in Figure 3 the name is inactive and the nurse/secretary can not update it. Another view is given to the doctor allowing him to update only the name of the patient keeping track of the name changed and the old name.



**Patient Maintenance Form**

Patient ID: 97

**PERSONAL DATA** | **PATIENT CONTACTS** | **COMMENTS** | **EMERGENCY CONTACT**

**PATIENT PERSONAL INFORMATION**

|                     |                                                                                                                         |                                                    |
|---------------------|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Title*              | Mr.                                                                                                                     | <input checked="" type="checkbox"/> Active Patient |
| Patient Name        | First Name*                                                                                                             | Father Name                                        |
|                     | Surname*                                                                                                                | Maiden Name                                        |
|                     | Abbas                                                                                                                   | Khailil                                            |
|                     | Bassam                                                                                                                  | Ahmad                                              |
| Date of Birth*      | 11/09/2006                                                                                                              | <input type="button" value="Calendar"/>            |
| Gender*             | <input type="radio"/> FEMALE <input checked="" type="radio"/> MALE                                                      |                                                    |
| Patient Status*     | Alive                                                                                                                   | <input type="checkbox"/> V.I.P                     |
| Financial Category* | Private Clinic                                                                                                          |                                                    |
| Nationality (ies)   | 1st Nationality                                                                                                         | Select a Nationality                               |
|                     | Other Nationality (ies)                                                                                                 |                                                    |
| Profession          | Select an Occupation                                                                                                    | Other:                                             |
|                     |                                                                                                                         |                                                    |
| Marital Status      | <input type="radio"/> Single <input type="radio"/> Married <input type="radio"/> Divorced <input type="radio"/> Widowed |                                                    |
| Number of Children  | No Children                                                                                                             |                                                    |
| Spouse Name         |                                                                                                                         |                                                    |
| Spouse Profession   |                                                                                                                         |                                                    |
| Reference           | Select a Reference                                                                                                      | <input type="button" value="+"/>                   |
| Patient Picture     | <input type="button" value="Browse..."/>                                                                                | <input type="button" value="UPLOAD"/>              |

NO IMAGE AVAILABLE

Figure 3: Patient Maintenance

## CHAPTER 3

### RESERVING APPOINTMENTS AND THE MRM

#### 3.1 Appointment

Appointment booking module is used to control the booking of appointments for different resources. The resource can be any clinic or client such as; a Dental clinic or a regular person. Each resource has a specific daily schedule that indicates the available periods for booking appointments. These periods are divided into basic units of time known as time slots. A time slot is the minimum period the appointment may occupy in using a specific resource. Each resource has one or more procedures to describe its usage. These procedures charge the appointment and adjust patient's accounts. The appointment booking supports the following functions and facilities: "It has been about a year since Work Health Solutions went paperless. Can you describe the mood in your clinic today compared to what you have experienced in clinics with paper records?"[7]

Inpatient is a patient who encounters the clinic for medical treatment. In other words, he is the patient who gets medical services, while occupying a bed in the clinic. An inpatient must have a medical number. The current inpatient can be an outpatient on another encounter with the hospital. Also, the current outpatient can be an inpatient on another encounter with the hospital.

---

After filling in all the forms for the patient the secretary/nurse has to book an appointment for that patient by going to the appointment's form and selecting the appropriate clinic "gynecology", "obstetric" a table opens showing the day divided into many slots, each slot accounts for a quarter of an hour the usual visit for a patient takes forty five minutes so the nurse/secretary will ask the patient about the time he/she wishes to reserve and check if it is not booked on the screen Then it has to click on the book button which opens a form allowing the employee to enter the patient's ID number, the number of the slots required and the physicians' name who will check the patient.

“The computers at both centers have primarily been used for research, administration, communication, and education and testing of the medical students and family practice residents. The use of the computers has been gradually extended to direct utilization towards patient care as a result of the implementation of a series of improvements that has considerably improved the ability to use computers in direct patient care. The improvements include new and faster computers in the clinic areas, a new medical information system, and an electronic medical record system.”[3]

#### For Same-Day Booking

(N.B. - Same-day booking is only possible when there is an available slot during the days and/or the Clinician is willing to see over-booking.)

- As the patient to pay for whatever fees (e.g. consultation fees, etc.), then issue receipt and fill up the Appointment.
- Direct the patient to the clinic location and advise him/her on what to do when they reach the clinic.
- Ask the porter assigned to bring the newly initiated medical record to the clinic.

#### For Next Available Booking

- Registration staff has to book the patient on the next available appointment or to any next available slot the patient may wish.
- Ask the patient to pay for the fees, issue receipt and fill in the Appointment Card (012), then give it to the patient.
- Advise the patient accordingly.

When an appointment is booked the button right next to it will change from “book” to “manage” in order to allow the nurse/secretary to have control over the booked appointment in many ways such as:

1. Cancel the appointment
2. Move the appointment
3. End the appointment
4. Start the appointment

The first choice which is cancel the appointment will force the nurse/secretary to enter a reason for canceling the appointment to ensure that patient will not try to take appointments and cancel them for invalid reasons, and at the end of the month reports will show patients who cancelled their reservation more than one time and the reason behind it ensuring that this patient is not wasting the nurses/secretary time. The second choice allows the nurse/secretary to move an appointment from one slot to another if this slot is not booked yet giving more flexibility for the patient and the employees. The third and the fourth choices allow the nurse/secretary to initiate and end the appointment which is a common procedure in medical fields.

The start status indicates that the patient has entered the doctor's clinic (or to perform the test). When the start "S" option applied to the appointment, the patient is charged for the procedure performed upon him in the clinic. Also, the receipt for the consultation will be generated (whether the patient will pay for the examination or part of it).

The cancel status indicates that the patient has completed his visit to the doctor. It can be left for the end of day procedure, to process the ending function. When the appointment is ended, the medical record is affected (if it is installed). The following status indicates that the appointment is canceled, and states the reason of cancellation.

[P] Canceled by patient.

[R] Canceled due to resource.

[D] Canceled by doctor.

#### Repetitive Appointment:

This type is used for an appointment in a group of appointments, which are repeated several times within a specific range of weeks. To book any type of the above, there are certain criteria to specify the doctor, clinic and specialty. After

specifying that, choosing procedures and switching from one to another is available.

#### Slot Blocking

This function is used to block a certain slot of time in a certain resource on a particular date where there can be no appointments taken on that particular blocked slot.

#### Appointments Booking Setup

There is a setup function that allows setting defaults for appointments booking such as; the date before which we can neither update the appointments nor add new ones.

#### Doctor Day Off

This function is used to setup a date range for a certain doctor to have a vacation in a certain resource.

#### National Vacation Master

This function is used to assign a national vacation to a certain range of dates, which means that the resources are no longer available for booking appointments on these particular dates.

#### National Vacation Exceptions

This function is used to exclude a certain resource from a certain date range that is considered to be a national vacation, which means that this resource will be available for booking appointments on the specified dates although it is a national vacation.

---

#### User Authority

This function is used to give the authority to a certain user to perform certain functions within the system as well as depriving other users from performing other functions.

### 3.2 The MRM

The MRM stands for Medical Record Manager and it is the core of my work, it is the medical record for the patient and it consists of many large forms that have lots of data to be filled giving the doctor all the necessary means to analyze his patients.

All the medical activities related to the patient are automatically reflected into the medical record files, which are built smoothly from the day to day operations. The MEDICAL RECORDS basic function is to present the recorded medical data to the doctor at any time in the order and sequence used. The architecture of the Medical Record and its adjustment of the new technology proved that it can answer all the physician's requirements: extensive reports and interconnected statistics can be generated based on this huge database. "In future the patient at home may have their condition monitored with automated warning systems operating remotely and instructions on what to do coming into play as condition changes. These systems can also be connected with mobile automated pathology testing."[5]

Medical Records supports the following functions:

- Treatment plan preparation and printing.
- Medical records abstracting.
- Special reports for dead patients.
- Grouping and listing of records by patients, cases, doctors, diagnoses groups, or diseases.
- Physicians, consultants, and top management can use the inquiries and reports included in this module.
- Designing medical sheets and maintaining sheet groups to achieve a good security protection.

The open structure database of the medical record enables the physician to review the patient's case and treatment history. It helps in producing statistics with different criteria. Researchers can use historical data to produce different reports on comprehensive patients' medical records and review them from different perspectives and conditions.

It is the responsibility of the Medical Records to follow appropriate procedures for Medical Record Retention.

#### POLICY:

A medical record shall be retained on all patients admitted or accepted for treatment to the clinic.

The patient record shall be preserved safely for a minimum of ten (10) years following the most recent discharge date. Such records shall be kept at least one (1) year after his/her date of majority, eighteen (18), but in any case, not less than ten (10) years from the date of the most recent discharge date.

The medical record is the property of the clinic and is maintained for the benefit of the patient, the professional staff and the hospital

MRM includes the following:

- History.
- Alarming Data.
- Clinical Examination.
- Temporary Diagnosis.
- Orders.
- Final Diagnosis.
- Treatment Plan.
- Consultation.
- Progressive Notes.
- Other Medical Sheets.
- Reports and Queries.
- Archiving.

- Discharge Summary.
- Notes.

#### History

This tab is used to enter or display the history of the determined case.

#### Alarming Data

This tab is used to enter and display the critical data of the patient such as being a diabetes patient or allergy patient, the matter that must be taken into consideration during the course of treatment.

#### Clinical Examination

This tab is used to enter and display data of clinical examination such as vital signs or local examination.

#### Provisional Diagnosis

This tab is used to enter and display data of the provisional diagnosis.

#### Orders

This tab is used to enter or display data of various orders given by the doctor to the patient. For example the doctor may give an order of performing some procedures like medical analysis or blood picture.

#### Final Diagnosis

This tab is used to enter the final diagnosis i.e. the diagnosis that follows certain medical operation.

---

#### Treatment Plan

This tab is used to enter and display a record that contains the treatment plan. This record shows the plan date, the procedures required in the treatment, the code assigned to the procedure, the textual description of the procedure, any comment that the doctor may add and the name of the doctor responsible for performing the medical procedure.

#### Consultation

This tab is used in case the doctor wants to transfer the patient to another doctor so as to follow up the case or to make medical group consultation.



### Progressive Notes

This tab allows the doctor to enter notes about the case within a certain date.

### Other Medical Sheets

This tab enables the doctor to add or design or view or modify a medical sheet for the selected patient.

### Reports and Queries

This tab is used to create various reports and queries of medical records.

### Archiving

This tab is relevant to all the images captured to the selected patient. It might be a capture or image or video or sound picture.

### Discharge Summary

This tab is used to show a report print layout that shows the medical code, patient name, date of birth, case number and the attending doctor.

### Notes

This tab is used to register any further notes about the patient as well as authenticating them

The basic forms of the MRM are:

- Clinical history
- Clinical examination
- Maternity notes
- Delivery notes
- Antenatal visits

Each one of those forms has many dropdown menus and text boxes to choose from and to fill in, at this point the patient has a permanent record and this is the procedure for maintaining this record

- The Registration form initiates the medical record for the newly admitted patient:
- Issues the auto generated number
- Prints a sheet for the patient to sign
- Makes the data available to the Medical Records clinic and other clinics.

- The system makes a permanent record for the patient. Nurse/secretary places the proper explanation for the record and medical record number (if not auto generated).

It is the responsibility of the Medical Records Department staff to maintain a standardized format for the Emergency Medical Record.

#### PROCEDURE:

An emergency medical record is maintained on all patients who are treated. The record contains the following information:

- Patient Identification
- Time and means of arrival
- Pertinent history of illness or injury and physical finding, including the patient's vital signs
- Pre-hospital care given, if any
- Clinical observations, including the results of treatment
- Reports of procedures, tests and results
- Diagnostic impression
- Final disposition, the patient's condition on discharge or transfer
- Aftercare Instruction Sheet
- Documentation for patients who return for scheduled re-checks within 3 days of each initial visit will be made on a physician's progress note. Patients who return to the Emergency Department after 3 days will have a new chart with a new number.
- A new emergency medical record will be made for any patient returning to the Emergency Department who was not scheduled to do so.
- The emergency record is authenticated by the physician and nurse responsible for its clinical accuracy.
- All prior records of previous Emergency Department visits as well as Hospital inpatient visits are made available when requested by the patient's attending physician or other authorized individuals

- It is the responsibility of the nurse/secretary to follow the correct procedure in medical record initiation.

#### PROCEDURE:

The nurse/secretary has to initiate a medical record to every NEW PATIENT.

- Fill up or complete the Patient.
- Enter the entries in the computer, and then issue a computer-generated Medical Record Number.
- Print the so-called "Registration Sheet."
- Issue an "Appointment time" to these patients; it must be explained, however, to them the importance of these times.
- Bill these patients accordingly.

The clinical history is divided into many fields to be filled and they are grouped base on research and on doctors' request as follows:

1. The doctor first has to check if the patient has done the following tests:
  - Cervical smear
  - Bone density
  - Mammography
2. Then it has to fill in the last medical act that contains feminine medical terms:
  - Age of Menarche
  - Para and LMP period
  - The IMB and PCB
3. The last part of the clinical history part1 is to enter the contraception history for the patient such as:
  - History of STD
  - Past gynelological history
  - Past medical history

This part includes terms that are used for gynecology and obstetric clinics. Other departments such as Food and Nutrition, Anesthesia, Outpatient, Admissions, Nursing, Utilization Management, and others, who have their own designated progress notes in the medical record, are responsible for the documentation on their forms.

Any department request to create new forms, or modify any accessible forms must present new drafts, or revisions, to the required department for agreement. They must state the function of the form, explanation for its use and if it is replacing an existing one.

After filling the first form in the clinical history the second form has information about family history.

- Father medical history
- Mother medical history
- Siblings' medical history
- Family medical history

The same procedure goes for the maternity notes, the clinical examination, delivery notes and antenatal visit filling in of course different data and different forms.

The medical record will be reviewed to determine if the record clearly, completely and accurately reflects the diagnosis, results of diagnostic test, therapy rendered, conditions, in-hospital progress of the patient and the condition of the patient at discharge.

- A random sample of medical records (at least 20% of monthly hospital discharges) will be reviewed for the Medical Record Review Function on a monthly basis.
- Records will be retrieved by the Medical Records personnel with sample size proportionate to physician practice patterns.
- Sample size will be representative of the full scope of services provided in the hospital and all physicians utilizing the facility, over time.

- Medical record review will be performed to determine if the record clearly, completely and accurately reflects the diagnosis, results of diagnostic tests, therapy rendered, condition, in-hospital progress of the patient and condition of patient at discharge.
- Entries into, and completion of medical records will be reviewed for timeliness.
- Medical record review includes, but is not limited to, analysis of:
  - Identification data;
  - Medical history, including the chief complaint, details of present illness, relevant past, social and family histories and an inventory by body systems;
  - A summary of the patient's psychosocial needs, as appropriate to the age of the patient;
  - Report of the conclusions or impressions drawn from the admission history and physical examinations;
  - Statement of the conclusions or impression drawn from the admission and physical examination;
  - Statement of the course of action planned for the patient while in the hospital and of its periodic review as appropriate;
  - Diagnostic and therapeutic orders;
  - Evidence of appropriate informed consent;
- Clinical observations, including the results of therapy;
- Progress notes made by the medical staff and other authorized staff;
- Consultation reports;
- Reports;
- Reports of any diagnostic and therapeutic procedures, such as pathology and clinical laboratory examinations, radiology and nuclear medicine examinations or treatments;
- Final diagnosis or diagnoses;

The scope of services also encompasses efforts made to provide:

- More timely and easier access to complete information throughout the organization
- Improved data accuracy
- Demonstrated balance of proper levels of security versus ease of access
- Use of aggregate data to assist all health care providers with information that allows for identification of opportunities to improve performance
- Accessibility of the medical record at all times to those authorized persons requesting their use for patient care
- Transcription service is available to all physicians. All documents received will be placed in the chart as soon as possible to ensure timely access to this information
- Availability of Medical Records personnel are during regular business hours. The house supervisor/designee has access to the department and all medical records during off hours.

|                      |                                                                                                    |                                                                        |
|----------------------|----------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| > PATIENT ADMISSION  | <b>Maternity Notes</b>                                                                             |                                                                        |
| > APPOINTMENT        | Gestation                                                                                          | Weeks: <input type="text"/> Days: <input type="text"/>                 |
| > FINANCIAL          | Para:                                                                                              | <input type="text"/> + <input type="text"/>                            |
| > REMINDER           | EDD:                                                                                               | <input type="text"/>                                                   |
| > PRIVATE CALENDAR   | Corrected EDD:                                                                                     | <input type="text"/>                                                   |
| > MED RECORD MANAGER | <input type="button" value="MATERNITY NOTES I"/> <input type="button" value="MATERNITY NOTES II"/> |                                                                        |
| > REPORTS            | <b>Booking Investigation:</b>                                                                      |                                                                        |
| > SYSTEM SETUP       | Hb Electrophoresis: <input type="text"/>                                                           | Diabetic Screen: <input type="text"/>                                  |
|                      | Hepatitis Antigen: <input type="text"/>                                                            | mini GTT: <input type="text"/>                                         |
|                      | Toxoplasma: <input type="text"/>                                                                   | Blood Group: <input type="text"/>                                      |
|                      | Rubella: <input type="text"/>                                                                      | Cervical Smear: <input type="text"/>                                   |
|                      | VDRL: <input type="text"/>                                                                         | MSU: <input type="text"/>                                              |
|                      | HIV: <input type="text"/>                                                                          | GBS: <input type="text"/>                                              |
|                      | Other:                                                                                             | <input type="text"/>                                                   |
|                      | <input type="text"/>                                                                               |                                                                        |
|                      | <b>Hb/Antibodies: *</b>                                                                            |                                                                        |
|                      | <b>Current Pregnancy:</b>                                                                          |                                                                        |
|                      | Age of menarche: <input type="text"/>                                                              | Normal: <input type="radio"/> YES <input checked="" type="radio"/> NO  |
|                      | Cycle: <input type="text"/>                                                                        | Certain: <input type="radio"/> YES <input checked="" type="radio"/> NO |
|                      | Ovulation Induced: <input type="radio"/> YES <input checked="" type="radio"/> NO                   | LMP: <input type="text"/>                                              |
|                      | LMP: <input type="text"/>                                                                          | U/S: <input type="text"/>                                              |
|                      | <b>Examination:</b>                                                                                |                                                                        |
|                      | Height(cm): <input type="text"/>                                                                   |                                                                        |

Figure 4: Maternity Notes

## CHAPTER 4

### FORMS AND CONSTRAINTS

#### 4.1 Management and Confidentiality:

It is the responsibility of the Medical Record Department staff to actively participate in the Organizational Plan for management of information.

**POLICY:** Providing health care is a complex collaborative effort highly dependent on information:

1. The data collected from and about the individual patient, the care delivered, the outcome of the care, and the performance of the organization will be managed by the medical records department.
2. The medical record will document the coordination and integration of the activities throughout all departments and services.
3. Consideration for timeliness, accuracy, security/confidentiality, access, efficiency, collaboration, integrity and uniformity of data will be factors in the overall management of information.
4. The aggregate data will be used in pursuit of opportunities for improvement in information management.
5. Redesign of important information and related processes to improve efficiencies will be an ongoing endeavor.
6. Greater collaboration and information sharing to enhance patient care will be a primary focus.

As the field of information management is constantly changing with improvements in technology, and as the services of the facility shift to meet the needs of the community, it is understood that this policy will achieve agreement over time, with revisions as appropriate to changes in the healthcare environment.



“A laboratory interface places results in the lab section of each patient’s electronic chart and notifies the provider of the new results.”[9]

Through the assessment of information management needs a list of priorities for improving the information management function is developed. Those areas where it has been determined to have the greatest impact on direct patient care and outcome of the delivery system will receive the highest priority for process revision and/or enhancement.

The need for coordination across the organization of all elements of the information management function is considered a primary focus for personnel development. Those individuals/departments identified as requiring knowledge and proficiency in the principals of information management are:

- Medical staff
- Nursing personnel
- Business, Admitting Department and Medical Records personnel
- Risk and Safety Management personnel

Basic principals of information management are discussed with the appropriate individuals during initial orientation. In-service updates are provided on an “as needed” basis and/or during annual performance evaluation. Medical staff service chairpersons are provided with basic principals upon acceptance of position. Advanced principals are reviewed with the leaders of the organization as appropriate to their knowledge base and complexity of information usage.

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#### Standards for Confidentiality:

The standards of timeliness, accuracy, security/confidentiality, access, efficiency and collaboration, integrity and uniformity of data are considered in the overall information management function.

#### Security/Confidentiality of Information

- Hospital has considered the need for, and appropriate levels of, security and confidentiality of data and information. To provide a balance between data sharing and data confidentiality individuals/departments have been identified with specific

policies/procedures outlining the access to, and need for, data and information.

- Medical Records Department personnel will have access to all documentation present in the medical records in accordance with established policies and procedures.
  - Nursing personnel will have access to all pertinent patient information for patients assigned to their unit to allow for optimum assessment, treatment and care of the patient in accordance with general nursing policies and procedures.
  - Medical staff will have access to all pertinent patient information that will allow them to render optimum treatment to any patient for which they are the attending, covering or consulting physician.
  - Clerical personnel will have access to all necessary patient information that allows for appropriate billing, insurance and financial procedures.
  - Information Systems will have access to patient information for reporting purposes in accordance with departmental policies and procedures.
  - All other individuals including ancillary personnel and administrative personnel will have access to patient data and information on an “as needed” basis, restricted to level of authority, in accordance with hospital wide policies and procedures governing information security and confidentiality.
- 

#### Data Definitions and Information Integration

There is an approved list of data definitions and accepted hospital abbreviations distributed to all departments in the facility. All data definitions are standardized to allow for integration of data throughout the facility.

While some information is managed in a computerized format, other information is managed manually. Sharing and integration of information is necessary to provide care in an effective manner.

## SECURITY/CONFIDENTIALITY OF INFORMATION:

- To provide a balance between data sharing and data confidentiality individuals/departments have been identified with specific policies/procedures outlining the access to and need for data and information:
- Medical Records personnel will have access to all documentation present in the medical record.
- Nursing personnel will have access to all pertinent patient information to allow for optimum assessment, treatment and care of the patient in accordance with general nursing policies and procedures.
- Medical staff will have access to all pertinent patient information that will allow them to render optimum treatment to any patient for which they are attending, covering or consulting physician.
- Clerical personnel under the business office umbrella will have access to all necessary patient information that allows for appropriate billing, insurance and financial procedures.
- Information Systems will have access to patient information for reporting purposes in accordance with departmental policies and procedures.
- Quality Services and Risk Management personnel will have access to all pertinent patient information, both clinical and financial, to allow for optimum assessment required in functions included under the departmental umbrella. Reimbursement, insurance and regulatory requirements in accordance with Utilization Management approved departmental procedures will also have access.
- All other individuals including ancillary personnel and administrative personnel will have access to patient data and information on an as needed basis, restricted to level of authority, in accordance with hospital wide policies and procedures governing information security and confidentiality.

## CHAPTER 5

### PATIENT ACCOUNTING

#### Accounting Form:

Financial form has the ability to link the different medical procedures and services with the financial standards and rules in the process of calculating the charges of the patients and the fees of the attending doctors. Financial application provides the user with a comprehensive methodology for processing the different financial data of the patients whether they are inpatients or outpatients. This comprehensive approach includes the definition of the charge items obtained by the patient, the various departments which offer the services and perform the various medical services to the patient, the definition of medical packages as well as financial categories, and so on. Consisting of four tabs, financial form covers the different transactions and financial actions which form the core of the program functionality. Such divisions or tabs share the process of charging the amounts which the patients should pay, the amounts which his company will pay, the amount of discounts according to the financial category, the down payments given, and the rest of payments (balances) to be paid by both the company and the patient at a later time as shown in Figure5.

#### Special Financial Category

Some companies and businesses make arrangements with a particular clinic to treat their employees according to special rules and criteria. These rules include special prices for services and medical items, special discounts, special division of charges between the patient and his company, and the calculation of the fees of the attending doctors of these patients.

## Package

A package can be defined as a collection or a group of medical services and items given to the patients of a certain financial category during a particular period of time and in a particular type of accommodation. The package has also its own rules and settings such as the maximum total limit, the warning amount, the manner of dealing with the patient exceeding the maximum limit of services, items, or number of days, in the framework of this package, the services given to the patient and their amounts, the charge items and their quantities.

MESSAGING
CLOSE
ENABLE
CHAT BOARD

TO NVD Group - SEND MESSAGE

Thursday Mar 01, 07

### DR. TOUFIC EID'S CLINIC

**SMART CLINICS**  
**DIGITAL SYSTEM**

PDI
APPOINTMENT
REMINDER
MIMI

- > MAIN PAGE
- > PATIENT ADMISSION
- > APPOINTMENT
- > FINANCIAL
- > REMINDER
- > PRIVATE CALENDAR
- > MED RECORD MANAGER
- > REPORTS
- > SYSTEM SETUP

PRG018 | TEID [1] | LOGOUT
SEARCH
GO
CANCEL

#### Charge by Medical Number

SEARCH

GO

CANCEL

[78] 01.03.2007, 08:00 AM - 09:15 AM, Gynecology, Started

Consultation

Add Item

| CI | Item Description       | Quantity | Item Price | Total Price | Discount Value | Patient's Part |                                     |
|----|------------------------|----------|------------|-------------|----------------|----------------|-------------------------------------|
| SA | Consultation           | 1        | 75000      | 75000       | 0              | 75000          | <input checked="" type="checkbox"/> |
| FA | Follow Up Consultation | 2        | 50000      | 100000      | 0              | 100000         | <input checked="" type="checkbox"/> |
| ST | Smear Test             | 1        | 30000      | 30000       | 0              | 30000          | <input checked="" type="checkbox"/> |
|    |                        |          | 155000     | 205000      | 0              | 205000         |                                     |

Next

SMART CLINICS

QUICK SEARCH  FOR

GO

DR. TOUFIC EID'S CLINIC

Figure 5: Financial

## CHAPTER 6

### FUTURE WORK AND CONCLUSION

This project uses state of the art techniques to develop a new system that helps medical staff (doctors, nurses, secretaries...) improving their work and using their time efficiently to help patients by reducing the paper work that has to be done especially in clinics and hospitals by allowing them to reserve appointment quickly and providing a medical record manger that saves all medical act for the patient from his first visit to the clinic and also a good financial and communication facilities. The system help doctors by providing an easy to use menus and many dropdown list that include medicines, medical terms and drugs allowing them to only choose from reducing time to fill in papers for patients and providing a database that shows the visits of the patient and all his medical act, all notes given by the doctor and the medicine he is taking for a better and faster follow up and for a more accurate results. Moreover, a small yet very useful mobile application is implemented to help the doctor viewing his appointment on his cell phone thus helping him for a better planning.

Future work in this project includes employing it in handling many clinics at the same time and connecting it to a network among doctors for a better consultation and group work and data transfer of course ensuring security and confidentiality.

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