1. Specification for Out Patient Management Module

Problem Specification

Virgo Hospital has its business growing considerably and the public appreciation of its health care services is reaching dizzy heights. Always noted for its super-specialty medical care and use of hi-tech equipment and operations, the hospital seeks to employ state-of-the-art information technology to forge ahead in the business The Chairperson of the hospital made clear her conviction that effective use of information technology will result in strategic business advantages. A free hand has been given to the project planners to deploy the best hardware resources and also get the best functional software. The following are some of the extracted "requirements" from the brainstorming sessions that company executives had over a period of three months.

- ∂ A decision was taken to have a *Health Information Network* for the hospital.
- ∂ The system is expected to cater to the various stakeholders like the patients, physicians, laboratory technicians, investors, employees, employers and others. Subsequently, the *Information Management Model* that the company chose has the following entities:
    - o Ambulatory care
    - o Acute care
    - o Home health care - where care is provided at one's residence
    - o Extended care - including camps, etc.
    - o Corporate systems - care to specific corporate entities
- ∂ The major areas for the deployment of information technology for the Virgo Hospitals are given below.
    - o Outpatient management.
    - o In-patient management.
    - o Facilities management, including beds, wards, etc.
    - o Accounting and billing.
    - o Stores and inventory management
    - o Pharmacy management (should be treated separately from general stores on account of its specialized nature).
    - o Blood bank management.
    - o Employees record, payroll and capability database.
    - o Operation theatre scheduling and management.
    - o Medical records - in this case it is desired to employ futuristic technologies with PCs deployed to all staff so that a *less-paper office* is realized.
    - o Laboratory analysis, data recording, etc.

- o Radiology data management through computer based imaging.
- o ICU management.
- o Image guided surgery using virtual reality techniques.
- o And several more…

∂ The task force observed that personnel, equipment, etc. should be easily transferable across the hospital, and all information accessible in a seamless manner.

∂ A host of Management Information System reports about the hospital to be available for access from all departments.

∂ Security is a key issue, especially when patient confidentiality is a vital factor in attracting customers and keeping them happy.

∂ Since the functioning of the information technology is life-critical, the system should have a high degree of reliability, availability and certain fail-safe measures.

∂ The task force conceded that while the reasonably complete requirements have been documented in the monumental 897-page report (not included here!), there is considerable chance that the requirements turn out to be somewhat volatile. Therefore the system must be designed to be malleable to change.

∂ Since manpower is expected to be the key, but highly expensive resource, it was recommended that computer based training systems be deployed for on-the-job training and continuing education for the staff - doctors, surgeons, nurses and support staff.

∂ Archiving of medical records, radiology records, etc. is a vital function with strong querying and reporting capabilities.

∂ Since much of the databases involve critical and confidential data, it is proposed to have a strong procedure built-in for audit trail. An audit trail, for instance, can help in analyzing when and by who was a set of data records modified.

∂ Provisions must also be made for a reasonable amount of *Decision Support* for managers and epidemiological researchers.

Of course, the foregoing statement was for the complete requirements for Virgo Hospital. For the purposes of this project, we merely are aware of the myriad requirements and the complexity of the software solution required. With this in the background, we shall concentrate on the Outpatient Management aspect only.

Outpatient Management Module for Virgo Hospitals

A set of partial requirements is given for the Out-patient Management Module. In this exercise, you are expected to primarily concentrate on these requirements with the general requirements of Virgo Hospitals serving as a complete picture.

1) Outpatients can be treated at the hospital and the records of the patients may be accessed.

2) Whenever a patient reports to the outpatient reception executive, he/she is required to fill in a fairly comprehensive personal data sheet as part of the registration

process. The reception executive quickly enters all these data before the patient may be allowed to proceed to a doctor.

3) Since some cases need to be attended to immediately, there are two forms of personal data taken. One is a Mini Registration Form that contains only the basic data items required to enable a person to be immediately attended to by a doctor. Of course, the Comprehensive Registration Form needs to be filled in later. The data items present in the Mini Registration Form as well as the Comprehensive Registration Form are given in Figures 1 and 2 respectively. The forms simply give the various data items that are needed by the hospital. No effort has gone into the format or look and feel of the forms at this stage.

4) General physicians who may later recommend the case to a specialist usually handle all outpatients. The hospital has on its roster a number of general physicians and specialist consultants. Their data, availability, etc. are all maintained in order to handle the tasks of outpatient management efficiently. Clearly, there is a need to create, add, delete, modify and view the database of the medical personnel

5) Each doctor should be able to access the records of the particular patient being treated by him/her. The doctor should be in a position to note diagnosis information, recommend laboratory tests, prescribe medication and even fix a future follow-up appointment. The doctor could also have the facility to refer the patient to a specialist. **The appointment for that is not within the scope of the out patient module.**

6) The doctor should have the capability to review the appointment history of the patient, the various diagnosis, tests and results, medicines prescribed, etc.

7) The outpatient management module must also provide a facility to charge the patients for the consultation, the tests and the medicines. Payments may be made through cash or through credit card. A bill would be prepared for each patient and handed over to the patient.

8) The reception executive must have the facility to make appointments for patients in advance too. Usually, the patients have to meet the same doctor they met in the first appointment. This rule is relaxed either when the concerned doctor is not available or when the patient has gone for a follow-up treatment in a different city.

9) The management requires certain reports to be made available daily, some on a weekly basis and some on a monthly basis.

10) The daily reports generated are the following.

   ∂ Number of patients seen by various doctors.

   ∂ Number of new patients and number of follow-up patients.

   ∂ Summary of consulting fees charged, the tests ordered and medicines prescribed for each patient.

11) The weekly reports and monthly reports generated are the following.

   ∂ Chart depicting numbers of new and follow-up patients handled.

   ∂ Average number of patients handled by each doctor during the week/month.

Mini Registration Form

Date:

1) Name (Surname, Middle name, First name):
2) Sex (M/F):
3) Date of Birth (dd/mm/yy):
4) Brief Statement of Complaint:
5) Contact Telephone Number 1:

   Contact Telephone Number 2:
6) Name of Next-of-Kin (Surname, Middle name, First name):

   Relationship to Outpatient:

Figure 1.1: Data Items in Mini Registration Form

Comprehensive Registration Form

Date:

Basic Details
1) Outpatient ID (OPID):
2) Name (Surname, Middle name, First name):
3) Sex (M/F):
4) Date of Birth (dd/mm/yy):

Contact Details
5) Present Address (Door No, Street, Area, City, State, Pincode):
6) Permanent Address (Door No, Street, Area, City, State, Pincode):
7) Telephones/Fax/Email

   Telephone (Work):

   Telephone (Home):

   Mobile:

   Pager:

   Fax:

   Email:

Contact Next-of-Kin
8) Name of Next-of-Kin (Surname, Middle name, First name):
9) Relationship with Outpatient:

10) Contact Address (Door No, Street, Area, City, State, PIN Code):

11) Telephone/Fax/Email

Telephone (Work):

Telephone (Home):

Mobile:

Pager:

Fax:

Email:

Personal Details

12) Marital Status:

13) No. of Dependents:

14) Height:

15) Weight:

16) Blood Type – RH:

Profession Details

17) Occupation:

18) Gross Annual Income:

Lifestyle

19) Vegetarian/Non-Vegetarian:

20) Smoker (Y/N):   Average No. of Cigarettes/Day:

21) Consume Alcoholic Beverage (Y/N):   Average No. of Drinks/Day:

22) Use Stimulants (Specify):

23) Consumption of Coffee-Tea/Day:

24) Consumption of Soft Drinks/Day:

25) Have Regular Meals (Breakfast/Lunch/Dinner)?:

26) Eat Home Food/Outside Predominantly?:

Basic Complaints

27) Statement of Complaint:

28) History of Previous Treatment:

29) Physician/Hospital Treated:

Important Medical Complaints

30) Diabetic:

31) Hypertensive:

32) Cardiac Condition:

33) Respiratory Condition:

34) Digestive Condition:

35) Orthopedic Condition:

36) Muscular Condition:

37) Neurological Condition:

38) Known Allergies:

39) Known Adverse Reaction to Specific Drugs:

40) Major Surgeries (History):

Figure 1.2: Data Items in Comprehensive Registration Form