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SPECIAL ARTICLE

Electronic Data Processing for Pharmacy Today

Matana Pratipasen, Ph.D.*

Data processing is the collection, manipulation and dissemination of data. Electronic Data Processing (EDP) involves the use of a computer system to accept data, process the data and produce information. A Management Information System (MIS) is the most important component in using an electronic machine for data processing. An effective management will be the result. However, the application of the new system has to be well-planned.

At present, the EDP has become an important tool for the provision of pharmacy services in many areas. Pharmaceutical personnel, therefore, especially pharmacists, have to be ready for the new technology and be able to communicate with the system analyst. The essential application is for the MIS in pharmacy. This system will immediately process various transactions and produce output as concise and accurate reports for the administrator in order to provide information for decision-making and planning.

The structure of the MIS can be considered in two view points.

First, the physical components, which include :

- Hardware such as an electronic computer, data preparation instruments and input-output terminals,
- Software, which includes the operating system, data management system, and generalized and specialized application programs, and
- Data file or data base which is the program and data stored in a computer media such as tape or disk pack.

Second, structural concepts of the MIS, which include the 3 levels of management:

- Operational control, being at the lowest level, is concerned with structured and repetitive activities that are measurable in achieving specific results. Operational information allows lower management to comment on how operating standards and policies can be improved to assist day by day operation,
- Tactical information, which is used by middle management to implement strategic plans at functional level,
- Strategic planning, the information used primarily by top management, for planning purposes. Strategic planning concerns itself with the establishment of objectives and policies.

The application of the computer system provides some benefits such as :-

- The computer tape or disk can be used to store data,
- Large amounts of transactions can be processed without human error,
- Routine decision-making can be made by programming, and
- Accuracy and high speed data processing.

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Preparation and planning for the new system include :-

- Well-planned scheduling for machine installing,
- Hardware, software as well as overall system testing,
- Personnel selecting,
- Parallel operating of the new and the former system over a suitable time period,

and

- Editing the input data before processing, to produce a worthwhile report.
- The consideration of the human factor is one of the important parts in introducing

a new system into an organization. If the personnel do not accept it, there will be a higher chance of the new system failing. On the other hand if they accept, it is more likely to succeed. Hence a good communication and introduction of the new system to the business personnel is essential. The incomplete new system should not be shown so that there will be fewer faults to cause a bad impression to the new system.

Electronic data processing has been introduced in pharmacy over the last decade. The application can be in every pharmaceutical area such as industrial, community and hospital pharmacy. An example of system designing for MIS in industrial pharmacy will be presented in this paper.

Management Information System For Industrial Pharmacy

A pharmaceutical manufacturing firm will be a model for MIS designing. The objective of this firm is to produce pharmaceutical products in various dosage forms such as tablet, capsule, solution and injection for wholesale retailing. Therefore, the system of this firm will comprise of the principle system for purchasing, manufacturing, financing, accounting and personnel. The MIS for this business is for long-range, middle-range and short-range planning. Every system for the MIS has to be communicated either directly or indirectly, for example :- Sales forecast subsystem (from the marketing information system) will affect the quantity of the product, the raw material ordered (from the purchasing and inventory information system) and the production (from the manufacturing information system). A good inventory control for the finished product and the raw material is also necessary.

Structure of the MIS for this pharmaceutical manufacturing model includes :- the marketing information system, the purchasing and inventory information system, the manufacturing information system, the personnel information system and the external factor information system. Only the first 3 systems will be discussed in this paper.

Marketing information system

This system is to provide the information for the marketing administrator to control the marketing operation. Accurate and up-to-date marketing information has to be available for decision-making.

Structure of the marketing information system includes

1. Sales order processing and customer service subsystem

This subsystem processes data from the customer sales order. Therefore, the input for this subsystem is from the customers. Sales order processing provides the information for controlling the daily business. The information of interest concerns:- the situation of the customer, the highest selling product, and the efficiency of the firm to distribute the pharmaceutical products to the customer.

2. Sales analysis subsystem

Sales analysis is to evaluate the sales and marketing data as well as the customers for selling control. The information available concerning sales analysis will be shown in various forms such as sales territory, product, period of time, and type of customer. The source of data for sales analysis is the customer sales invoices. It includes data concerning the customer such as name and address as well as transaction data such as date, amount and selling price. Sales analysis data reveals marketing trends, provides information for the sales force and assists decision-making regarding additions or deletions to the product range.

3. *Sales forecast subsystem*

The correlation of production and selling depends on the sales forecast data. This is essential for market planning and inventory control. It is also the basis for production control. This subsystem provides the information for marketing prediction.

4. *Sales administration subsystem*

This subsystem collects data from the following :-

— Advertising: Data of the relationship between advertising and sales/profits including data as to the cheapest advertising forms which result in still maintaining the set profit goals,

— Personnel selling: Data from the evaluation of selling by salesmen is provided, and

— Sales promotion: The expense for sales promotion versus the increased profit is evaluated and data is obtained.

5. *Market research subsystem*

Marketing, product, and service data are processed. Market research reveals the situation of the firm and is a tool for the administration of pricing and selling. It initiates the introduction of new products into the market.

Data files for the marketing information system include:- sales order file, sales forecast data file, back ordered file, advertising data file, market research data file, salesman file, customer master file and master price file.

Purchasing and inventory information system

The aim of this system is to collect information regarding the product from the raw material buying stage through the finished product distributing stage. The purpose is to control the product on hand for the customer, with lower costs.

Structure of this system consists of 4 subsystems

1. *Buying and follow-up subsystem*

The information is obtained from the processing and following up of the purchase order. It is an effective purchasing operation.

2. *Inventory control subsystem*

This subsystem is to record and update data from the raw material as well as finished product stock managing. Whenever the level of either the raw material or the finished product is changed, the data has to be processed.

3. *Physical distribution subsystem*

This subsystem includes the information for handling shipping orders, outgoing traffic, shipping schedules to customers, and other order service-related activities. The desired goal of this system is to find the method of providing efficient movement services. This program should operate at the lowest possible cost consistent with satisfactory customer service.

4. *Vendor performance subsystem*

The information is derived from the evaluation of vendor performance. Performance reports in this regard are calculations of the price, delivery, and purchase performance indices for specific vendors and buyers.

Data files for the purchasing and inventory information system include:- purchase order file, follow up file, receiving, file, delivery file, raw material inventory data file, finished product inventory data file and vendor record file.

Manufacturing Information system

The manufacturing of the finished product involve many operations. It must be planned, scheduled, routed and controlled for output that meet specific deadlines. Manufacturing informational needs vary from work center and production reports for operating management to specific operational machine data. A computer system for manufacturing data processing is accomplished by collecting

data from various manufacturing departments, processing and producing output reports. Such a system will reduce production errors.

Structure of this system includes :-

1. *Production scheduling and control subsystem*

Data concerning production scheduling and control is processed for full utilization of man and machine power. Work load is assigned to machine and instrument equally to avoid any wasted power. Actual production has to follow production planning. Production planning information should be coordinated with other planning such as cost control and sales planning.

2. *Manufacturing operation subsystem*

This subsystem is to process the manufacturing operational data to produce a finished product according to the requirement with lowest expense. Summarized reports for production and exceptional reports such as when any machine is out of order will also be produced. This subsystem has to communicate well with the production scheduling and control subsystem for the best scheduling and machine loading.

3. *Quality control subsystem*

Data concerning quality control for raw material, product in processes, finished product and packaging material are to be processed and report are produced.

4. *Research and development subsystem*

Data from a research and development program has to be stored and processed. Information concerning any research project is needed.

5. *Plant and machine maintenance subsystem*

This subsystem processes data and provides information about the machine and plant maintaining program. The information for production, the machine and instrument situation should be available for management.

Data files for this subsystem include:- production data file, production scheduling file, machine and instrument utilization data file, maintenance scheduling file, quality control data file, research and development data file, labor cost file, machine history master file and product information file.

In conclusion, the EDP has become an important tool for pharmacy services in many areas over the last decade. The essential application is for the MIS in pharmacy to provide an effective management. A well-planned new system can be developed by personnel selecting, overall system testing, editing the input data before processing as well as taking the human factor into account. This system will be able to work on many transactions to produce accurate and high-speed data processing without human error.

A model of system designing for MIS in industrial pharmacy is proposed. It consists of 6 information systems. Each information system includes various subsystems for data processing. These systems are the marketing, the purchasing and inventory, the manufacturing, the finance and accounting, the personnel, and the external factor information systems. The first 3 systems are discussed and many data files are presented. The finance and accounting, the personnel, and the external information systems will not be discussed in this paper as they do not directly related to pharmacy.

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