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THE DEVELOPMENT OF AN AUTOMATED MEDICAL
ADMINISTRATIVE SERVICES BUSINESS
(AMAS)

By

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B.A., State University of New York at Plattsburgh, 1969

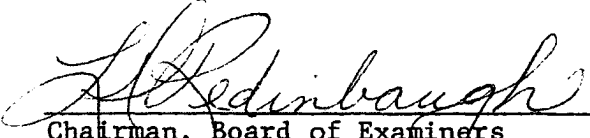
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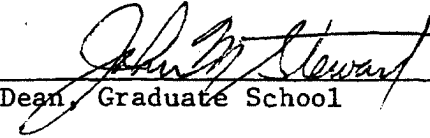
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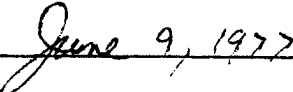
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CHAPTER I

OVERVIEW

Statement of Topic

The ancient physician was a scholar, his work dealt with various aspects of the human condition and often when writing down his findings, the basis for large sectors of science were established. His work was usually experimental and the results formed the vast volumes of medical science. These early physicians were usually sponsored and required little with respect to the maintenance of existence. As time passed, the physician developed into an individual whose skills were desired by all. This desire soon was recognized as an avenue through which the physician could direct his great humanistic effort.

During the age of exploration, the physician service concept became apparent. As new worlds were conquered, the growth of the physician as a service specialist was developed. In the early pioneer days of this country, the doctor as a professional service industry began to be revealed. With this unveiling, the first indications of the physician as an administrator became visible. As the physicians' services became more and more available, so did the amount of effort of the administration of a practice. By 1929, 3.6 percent of the gross national product¹ (GNP) was expended on medical services. Truly, the

¹Walter Adams, The Structure of American Industry, (New York: Macmillan Publishing Co., 1971), p. 419.

physician as a business form had arrived. By 1967, the medical expenditure share of the GNP had risen to 6.2 percent.² Today, the status of medical care has become a necessity and, to some extent, a civic right. The problems that this presents to the physician, in terms of the administration of a medical practice, are immense. In addition to being a physician, he must also be a manager and a student of the law. This is the crux of the problem. The modern physician's most valuable resource, "time," is being consumed in ever increasing amounts.

Because of the status of medical care and the demand upon the physician, the quality of physician performance is often of lesser quality.³ Additionally, the cost of medical services is on the rise at a rate of 6.7 percent per annum.⁴ If this trend continues, the availability of individual health care will be limited to a very few people in the future. Additionally, the need for government intervention will become apparent and then the private nature of U.S. health care will disappear. To prevent this from occurring, the private practitioner will have to develop methods whereby the quality of health care will increase and, at the same time, the cost of that care will not rise in a disproportionate rate to normal inflation. Additionally, the physician will want to accomplish this without reducing income.

²Ibid.

³For discussion see, Robert S. McCleery, M.D., et. al., One Life-One Physician, (Washington, D.C.: Public Affairs Press, 1971).

⁴R. Fein, "Some Health Policy Issues: One Economist's View," Public Health Reports, October 1975, p. 389.

Steinwald and Sloan⁵ concluded that the determinants of physicians' fees are sufficiently consistent with a profit-maximization model. If this is indeed the case, then effort should be directed toward the control of these model constraints in lieu of increasing fees to control the cost of medical care. The difficulty here is to insure that, while costs are controlled, quality is not decreased.

Objective of Paper

The objective of this paper is to address the problem mentioned above. This will be done with regard to the "physicians' administrative task." The purpose is to explore the possibility of developing a business that would accomplish the physicians' administrative task in such a way that both the quality of care will be increased and the cost of service will be stabilized. The ideas which were explored were not conceived as being the ultimate or complete solution to the health care problem facing the country. On the contrary, this study is simply a small segment of the health care problem and the possible framework for the solution of the problem with regard to that segment. In theory, the benefits desired from such a service would be obtained by reducing the cost of administration and increasing the 'with patient time' of the physician. Additionally, the use of modern automation techniques and equipment would be employed to improve medical word processing, patient history data and improved use of data for treatment activities. The resultant would also be seen as reduced administrative cost, increased

⁵For complete discussion see, B. Steinwald and F. A. Sloan, "Determinants of Physicians' Fees," The Journal of Business, October 1974.

patient loads, thereby reducing the necessity for fee increases and aiding in the stabilization of health care cost.

In discussing the development of the "Automated Medical Administrative Services Business" (AMAS) four basic areas were considered:

1. General Research - By way of a survey of Great Falls, Montana. The objective was to obtain a practical feel for the physicians' administrative task.
2. System Development - The construction of a computer based management system to accomplish the physicians' administrative task.
3. Organization of AMAS - The development of the management approach and structure of the business.
4. Marketing Approach - The development of the general ideas and methods of selling the AMAS service to physicians.

The development of AMAS has not been done just in the light of those humanitarian qualities previously discussed. On the contrary, the discussion encompasses these as ultimate in service. However, the fabric of the AMAS construction is such that the resulting firm will be a viable and effective business form.

Methodology

Before beginning the actual discussion of the development of AMAS, a few words about the methods used in this paper are in order. The primary purpose of both literature and field research was to supplement general ideas and notions originally conceived. Due to the pointedness of the topic, little data were available in literature that were directly applicable. What data that were used were merely state of the art information that required translation for use in the AMAS concept.

It was due to this problem that the field survey was initiated and the results of the survey have been used as data in building a case for the pursuit of the paper objective.

In presenting this paper, care was taken in maintaining subject matter integrity. Therefore, each chapter presents a reasonably complete study of the four basic areas of consideration in the development of AMAS.

CHAPTER II

THE PHYSICIANS ADMINISTRATIVE TASK

Objective of Study

In selecting the task of exploring the possibilities of automating the physicians' administrative task, there appeared to be two sources of data available. Due to the narrow and somewhat minor nature of the topic, very little specific information was available in the current literature. In view of this shortage, it was felt that a limited survey would be necessary to fill the void.

The objective of the survey was simply to obtain a practical feel for the topic and hopefully some specific data upon which cost and pricing questions could be discussed. The fact that the survey was conducted in Great Falls should not suggest that the purpose of the survey was to provide data for the establishment of such a business in Great Falls, Montana. The intention was, as previously mentioned, to feel the pulse of the problem and not to provide a broad base of detailed information upon which an extensive or comprehensive study of the physicians administrative task could be made.

In discussing the survey of doctors, the following areas were considered: First, an explanation of data collection procedures include the reasons for site selection, second, an analysis of the data obtained in the survey results, and finally, the drawing of any conclusions which could be made as a result of the survey.

Data Collection Procedures

The first question to be answered in any data collection problem was where or what would the population be. This particular problem in this study was solved by limiting the objective of the study to simply obtaining a feel for the administrative task. Additionally, the fact that the business in mind would be developed for a mid-sized city made the selection of Great Falls obvious. The first view of the Great Falls medical community revealed two major hospitals, approximately 200 resident medical doctors of various specialties, another 50 optometrists, 100 dentists, and a large patient load per capita. This appeared to be a typical¹ population to which a survey of the type in mind could be revealing. Furthermore, the ease of access to questionnaire respondents and economy of conducting the survey made the area desirable.

Various methods of survey were considered at the outset. The methods were quickly narrowed when consideration of sample size was made. It was felt that in order to obtain reasonable results from the survey, at least 25 percent of the area doctors would have to be surveyed. In deciding which 25 percent would be surveyed, the population was limited to medical doctors of various specialties. This, of course, immediately eliminated the dentist and optometrist and brought the population size down to approximately 200 doctors. The reason for limiting the questionnaire to medical doctors was simply to narrow the basis of the survey. Furthermore, the applicability of the business that was developed as a result of data application would not suffer if all categories of medical

¹Per capita physician ratios indicate a simple comparison for all states. U.S., Statistical Abstract, 1973, p. 74.

physicians were included. The pure medical doctor's practice was the basis for all medical practices and so provided a solid foundation upon which to build.

The number of physicians that would be surveyed was 50. In view of the number, personal visitation and telephone survey methods were ruled out and a letter or mail survey was determined to be the most feasible.

The question of what data would be desired from the survey was more difficult to answer than location of and how many physicians were to be surveyed. In dealing with this problem, an attempt was made to separate the physician's administrative task completely from the medical service product. In doing so, three basic areas surfaced.

1. Identification of the doctors practice as a business type.
2. The cost of operation of the medical business.
3. The impact of the administrative tasks on the operation of the business.

Taking these basic considerations the feasibility of adding a service to accomplish the administrative task was then considered. The construction of the survey addressed three subject areas.

1. General questions
2. Questions on cost
3. Questions on the service.

The first area, general questions, dealt mostly with identification, however, certain classification questions were asked. The questions on cost dealt mostly with operations, however, certain attitudinal questions with respect to the impact of practice administration were asked.

The questions on the service covered both the impact of practice administration and availability of an administrative service business.

The three sets of questions resulted in a fairly comprehensive set of questions that not only attempted to gather data but also provided a small measure of physician attitudes with regard to the administration of their practice. The 38 question, 8 page questionnaire, appeared to be entirely too extensive and seemed to violate many good survey techniques. Upon consideration of this problem it was felt that the survey volume was required in order to obtain the "feel" that was desired. Furthermore, the survey respondent was considered and it was felt that the level of education of the respondent coupled with the purpose of the survey would mitigate the size problem. Additionally, the respondent would either carefully reply or simply toss the questionnaire to one side, which in itself is a finding from the attitudinal data viewpoint.

The final questionnaire was assembled and mailed to 50 of the 200 physicians. Each questionnaire package contained the following items.

1. Questionnaire (10 pages).
2. Addressed and Stamped Return Envelope.
3. Cover Letter (2 pages).
4. Stamped Postcard.

(See Appendix I and Appendix II for copy of letter and questionnaire respectively.) University of Montana stationery was used for the cover letter and endorsed by the resident administrator. All envelopes and postcards were stamped with the local University return address.

The questionnaire was finalized and mailed on September 1, 1976. Marked on each questionnaire was a stamped date of September 13, 1976,

the date requested for the completion and return of the questionnaire.

Analysis of Data

In analyzing the questionnaire data, four basic areas were considered.

1. Product Service - What type of business activity was the physician involved in? What was the basis of the physician's medical service as a business?
2. Demand/Use - Specifically, was there a segment of the medical services business that was able to be partitioned out and labeled "Administrative Task?" If so, what are the needs?
3. Pricing Data - To obtain an idea for the dollar value of the service application to the "Administrative Task." By viewing the cost of "Administrative Task" to each physician.
4. Timing Considerations - The objective was to improve understanding of the marketing problem.

Before going into each of these specific areas, identification and analysis of the respondent population was necessary to put the specifics in proper perspective. The following facts are offered for the purpose of sample identification:

Total Population:	200		
Number Sampled:	50	<u>Results:</u>	
		a. Percent returned were	36
		b. Percent usable ²	26
		c. Percent of total population	41 ³

²Usable here means complete enough to tabulate and combine meaningfully with other respondent data.

³The 26 percent returns included group practices which indicated a collective reply for all the members of the group. This type of reply brought the total number of physicians questioned to 82 out of 200 or 41 percent of the total population.

Product Service - By the nature of the physician's business, it is obvious that he is involved in a service. However, it is not so important to the study; what is important is the type of service that he is in. In the case of the questionnaire, the sample surveyed a rather broad range of physicians with regard to the establishment of medical practice and specialty.

This pattern of establishment, shown by Figure 1, is indicative of the responsiveness to the population factor and affirmation of the service demand. The sample revealed the numerous specialties available to the medical consumer.

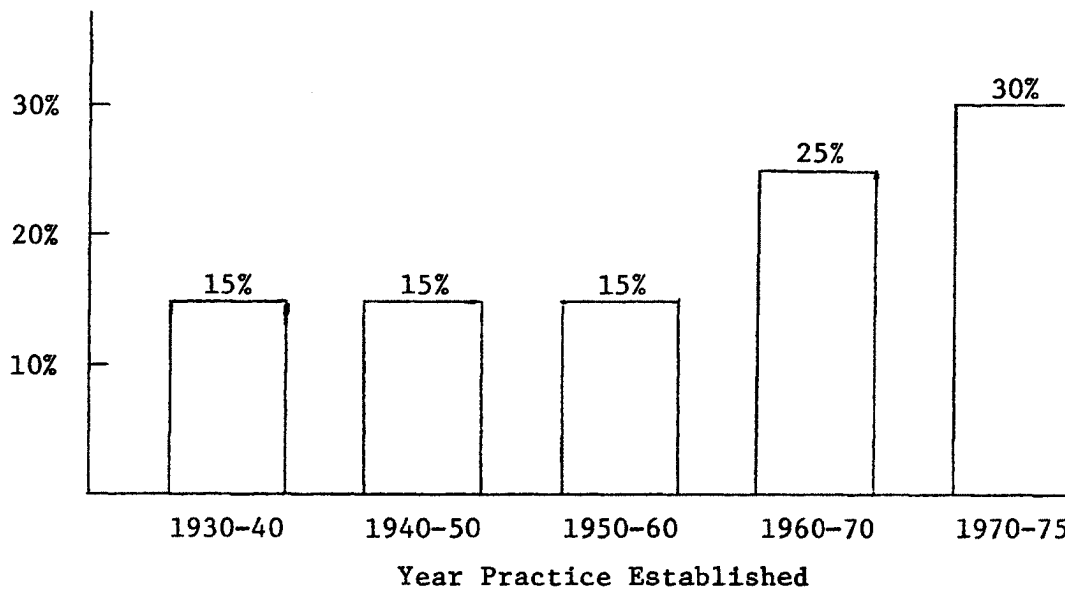


Fig. 1.--Practice Establishment by Sample Percent - Great Falls, Montana.

Each of these specialties as shown in Table 1 is a unique medical service which is sold in just that way. Further analysis of Product Service would be of little value at this point. The objective has been served, i.e., the service performed is not homogenous. On the contrary, it is quite unique and thus the specific applications which could be

developed for a single doctor, with regard to medicine, may not, and in all probability will not, apply to any other.

TABLE 1
QUESTIONNAIRE RESPONDENTS BY MEDICAL CATEGORY

<u>Specialty</u>	<u>Number of Physicians Practicing</u>
Internal	35
Ob-Gyn	34
Surgery	5
Pediatrics	2
Other	6

The question of business form was also addressed in the questionnaire. The results indicated that the physicians questioned were involved in one of three different business types. Table 2 shows the breakdown of the respondents by business type. The number of physicians involved in the group practices varied from 2 to 35 physicians with some sole practitioners forming corporations. Even though, in the case of group practices, where there was a pooling of medical services, there was a sharing of employees in only 43 percent of the cases. To obtain a feel for large versus small practices, a question concerning the operation of laboratory facilities was asked. The results indicated that only in the technical medical area, such as radiology or in very large groups, was a laboratory facility maintained. The apparent reason in the case of radiology was the uniqueness of the equipment to the medical specialty. In the case of large group practices, the question of economics of scale forces the in-house laboratory operation.

In summarizing the attributes of the physician medical service as a business, based upon the data gathered, the following list was developed.

TABLE 2

PERCENT OF RESPONDENTS BY BUSINESS TYPE

<u>Type</u>	<u>Percent of Sample</u>
Sole Practitioner	46.15
Partnership	23.08
Incorporation	30.77

1. The physician medical service industry has no specific origin in time. Each practice is established by each physician as he becomes qualified to perform the service. Therefore, a time identification cannot be applied to the industry.
2. The industry is composed of numerous specialties, all of which have a common basis in the medical sciences but serve a unique portion of that broad base of knowledge. In this respect, it is possible to establish a task identification that would provide a basis for service application.
3. It appears that group and corporate practices formed a major segment of the industry. In view of this situation, the currently existing identifications with the partnership and corporate forms of business can be easily applied to the physician medical service for identification.

Now that some basic attributes of the physician medical service as a "business form" have been established, consideration will be given to the demand by this industry for servicing of the physician's "Administrative Task."

Demand/Use: In determining the existence of the "Administrative Task," several different questions were asked. Question number 9 simply asked, "Do you consider the administration of your practice a major activity?" In 61.5 percent of the cases the respondent indicated that it was.

To follow-up this question, several others with regard to time involvement were posed. The results of these questions are shown in Table 3.

TABLE 3
RESPONDENTS TIME INVOLVEMENT

Activity	High	Low	Average
Office Hours per Week	50	16	30.3
Hospital Hours per Week	7	21	12.9
Time/Patient/Minutes	45	15	22.0
Time on Administration Hours per Week	.5	6	2.7

The overall results of this category of questions indicated that the average physician spent 45.9 hours a week with activities relating to his practice. Using the average data column, the calculated percentage of time spent on the administration of the practice is approximately 6 percent and 72 percent of the doctor's work week is devoted to the office environment. A breakdown of the activities surrounding time spent with each patient was not made. However, if the medical records update by the physician are considered, then based upon average time with each patient of 22 minutes would yield a total weekly visitation at approximately 83 patients, assuming five minutes was used for records update or other administrative task involving the patient, then a total of 7 hours per week are involved. This increases the total physician involvement in administrative duties to 21 percent of the work week. From the standpoint of time involvement, the administrative task can be easily partitioned out of the physician's medical services business.

In order to focus on the specific needs in the area of the physician's administrative task, a series of questions dealing with employment of personnel and the identification of their tasks were asked. The results of this set of questions is shown in Table 4. As can be seen from the task involvement section of Table 4, every physician has at least one employee involved in one of the administrative tasks, (task 2 through 5). In most cases, two or more (69 percent) employees are involved in administrative functions, on either a full- or part-time basis. A further finding of this set of questions was that in those cases where the physician has employed other than medical personnel, the employment is based on some form of administrative activity which deals with some phase of accounting activity.

The next step in the determination of the existence of the "Administrative Task" was to learn if the physician had any outside assistance (service agency) in the various administrative areas. The results of the questionnaire were a little sketchy. However, the following general statements may be made with regard to outside assistance.

1. Generally (more than half) of those questioned had some sort of outside assistance in the general accounting area.
2. Only in the case of large (group) practices did there appear to be a need for outside assistance with respect to third party billing.
3. Medical record keeping was accomplished, in all cases, entirely by in-house resources.

Other than these general statements, very little can be said with regard to the use of outside assistance in the accomplishment of the physician's administrative task. In general, the physician provided for most of his needs in this area by use of his own employees.

TABLE 4
 PHYSICIAN EMPLOYEE TASK INVOLVEMENT

Respondent Number	Task Involvement by Employee*					Full-time Employees	Part-time Employees	Task Employees
	1	2	3	4	5			
1	x	x	x	x	x	5	1	4
2				x	x	1	1	2
3	x	x	x	x	x	80	10	58
4		x		x		2	--	2
5	x	x				1	1	1
6	x				x	1	1	1
7				x	x	1	2	3
8	x			x		3	1	2
9				x		1	0	1
10	x	x	x	x	x	num.	num.	num.
11				x	x	1	1	2
12	x			x	x	3	--	2
13					x	1	--	1

*Task 1 - Nursing
 Task 2 - Office Management
 Task 3 - Insurance (3rd party billing)
 Task 4 - Assistance/Billing/Appointments
 Task 5 - General Administrative/Accounting/Accounts Receivable

NOTE: The objective of listing number of employees was to subtract strictly medical employees (nurses) from all other employees in service to assess administrative work force.

The "Administrative Task" questions may be summarized as follows:

1. The doctor considers the administration of his practice a major function. Further, a significant portion of the physician's work week was found to be devoted to strictly administrative activities.

2. The physician has in his employ one or more non-medical personnel for the purpose of accomplishing activities in the areas of accounting, appointments, accounts receivable, billing, general administration, insurance or third party billing, office assistance and office management.
3. Generally, the only area in which the physician has outside assistance is in the area of accounting. Further, it appears that in organizations that include large groups of doctors for the most part maintain self-sufficiency.

Having some understanding for the physician's administrative task, the next consideration was to establish a cost to the individual physician.

Pricing Data: To determine the cost of the service proved to be the most difficult area upon which to obtain information. The method chosen was making inquiry about the current employment cost and the total annual administrative cost. From these two quantities, some basic data about the cost of administration was determined.⁴ Due to the sensitiveness of this area, only general questions were asked.

In the area of employment, three values were asked for: weekly, monthly, and yearly employment cost. The objective in doing this was to get at least one of the three and then compute the others. No distinction was made with regard to the type of employee. Therefore, the cost is assumed to be for all categories of employee. The results indicated that on a per physician basis, the average yearly employment cost was approximately \$14,000. The annual administrative costs were calculated

⁴ A rough approximation of annual administrative cost was determined by the following formula: Annual Administrative Cost - Total Annual Administrative Cost - Employment Cost. Thus, a dollar figure over employment.

and a figure of \$11,000 was determined on a per physician basis. These amounts are not completely revealing with regard to cost to the physician. When viewing the cost to the physician on the basis of medical specialty, the following results were obtained, (Table 5).

TABLE 5
ANNUAL COST BY PHYSICIAN SPECIALTY

Medical Specialty	Employment Annual Cost	Administrative Annual Cost
Surgeon	\$ 6,500	\$ 1,300
Pediatrician	10,500	15,000
Ob-Gyn	15,000	12,000
Other*	12,000	10,000

*Other category includes all other medical specialties sampled. (Range \$10,000 - \$15,000 employment, \$3,000 - \$15,000 administrative.)

As can be seen from Table 5, these averages cannot be applied to all categories of medical specialty. In the case of surgeons, these costs definitely do not hold true. The reason that this is so is due to the hospital based nature of the surgeon's practice. The other three categories fall into line with respect to the averages previously cited. It is interesting to note that the Ob-Gyn physician carried the highest cost for employment while the pediatrician was shown to be the highest with regard to administrative cost. The high cost of employment with respect to the Ob-Gyn physician is probably due to the higher technical qualifications of the physician's medical assistance, whereas the high administrative cost for the pediatrician is probably due to the numbers

of personnel required to conduct a child care practice, as well as the child care requirements for initial documentation, frequency of billing, and maintenance of current files, as illustrated in Table 6.

TABLE 6
PER PATIENT ADMINISTRATIVE COST BY PHYSICIAN SPECIALTY

Medical Specialty	Administrative Annual Cost	Annual Patient Load*	Administrative Cost Per Patient
Surgeon	\$ 1,300	\$1,250	\$1.04
Pediatrician	15,000	6,250	2.40
Ob-Gyn	12,000	6,250	1.92
Other	10,000	5,500	1.81

*Annual patient load (APL) is calculated from the average daily patient load (DPL) as follows: $APL = (DPL \times 5 \text{ work days}) / 50 \text{ work weeks}$.

A further breakdown with regard to administrative cost can be made. In this case, a look at the per patient cost to the physician's administrative task is examined. The per patient administrative cost shown in Table 6 is the cost in terms of what must be billed to the patient for that visit in order to break even on the annual administrative expense. The questionnaire did not request the respondent to break down these costs by category so, the dollar value assigned to the per patient administrative cost may not reflect only the strictly administrative expense. It is noted that even though the surgeon had a very low annual expense, his per patient costs were still in the relevant range of all other categories of physician specialty. Again, the pediatrician had the highest per patient cost indicative of the type of patient effect on administrative cost.

With regard to pricing data, several points can be put forward to summarize the analysis.

1. Medical specialty had a significant impact on the cost of the administrative task to the physician. The low cost to the surgeon and the high cost to the pediatrician were demonstrative of this situation.
2. A dollar value can be applied to the physician's administrative task. Furthermore, the dollar value must be adjusted with respect to medical specialty.
3. The dollar value of the physician's administrative task was established after the cost of employment, which established a real dollar value upon which the basis of service application could be made.

A dollar value can be placed on the physician's administrative task. This is useful information but the real question remains, does the physician want someone else to place the cost on his administrative task. The next step to be considered was the timing problem in the acceptance by the physician of such a service.

Timing Considerations: As mentioned above, the third part of the questionnaire was devoted to questions on the physician's attitudes about the use of a service organization that could be hired to accomplish the "Administrative Task." The questionnaire offered a description of such a service and a brief explanation of how it would work. Briefly, the service was described as having six basic services.

1. Appointment Scheduling
2. General Accounting
3. Automated Billing
4. Medical Record Synopsis
5. Medical Practice Management Reports
6. Specialized Service

A flow chart of operations was given and then a series of questions were asked. (See Appendix II, for the complete questionnaire.)

Prior to questioning on the example of the service, two questions were asked. One question was with regard to current use of a service agency and the other with the effectiveness of the agency used. The results of this section indicated that 23 percent of the physicians now or had at some time in the past used a service agency of some type to assist in their administrative task. When asked if they felt that a service of this type could efficiently and effectively accomplish the administrative task, 69 percent of the respondents indicated that it could not. An interesting point to note is that all those who used a service agency replied negatively to this question. It was easy to see that the question which followed the example of the service would be biased by lack of experience or bad experience with respect to the respondent sample.

As expected, after the explanation, 69 percent of the respondents indicated that the complete service would not be of use to them. Furthermore, only 23 percent of the respondents felt that a portion would be of use. When asked if the service would minimize the administrative task, the same reply was obtained. When asked to place a dollar value on such a service, only one respondent indicated a value, approximately 30 percent of the respondents were uncertain, and the remainder indicated zero dollars or no reply at all.

The next set of questions in this section dealt with attitudes toward specific aspects of the total service. Of the six services described, it was felt that the only totally new service was the Medical Record Synopsis. When asked if such a service would be of value,

approximately 70 percent of the respondents indicated that it would not. When asked if they would use such an agency to provide special or tailored services, not a single positive reply was received.

To obtain some feel for the physician's familiarity with the use of automated data processing equipment, a question on the use of telecommunication was asked. When asked if an additional expense for telecommunications would be incurred, 23 percent replied positively. Furthermore, in all cases where the respondent either felt the service would be efficient, of use, or minimize the administrative task, the respondent indicated that the output device to them should be either CRT or printer device. No positive conclusion, with regard to familiarity, could be made. However, the fact that in-office output was desired in those cases where a positive indication toward the service was present, tends to indicate a reasonable state of understanding with regard to EDP.

In offering a service such as the one described by the questionnaire, it is difficult to determine what order of priority that should be given to the service programs within the service package. In order to get a feel for the physician's priorities with regard to the service package, the respondents were asked to rank five of the services described earlier. Of the respondents doing this, the following order was established:

Highest: Billing System
Medical Records System
Management Reports
General Accounting
Lowest: Appointments Scheduling

Each physician replying provided an order of all these services, one through five and the quantitative results are indicated above. Although this is not conclusive, the ordering tends to agree with an intuitive ordering that could be developed for a service package such as the one indicated.

The final question in the service section of the questionnaire dealt with the identification of possible problem areas in the marketing of the service package. This question asked the doctor to check those items listed that would be of concern to him, with regard to the service package that had been described at the beginning of the section. (See Table 7.)

TABLE 7
PHYSICIAN CONCERNS WITH SERVICE PACKAGE

<u>Physician Concern</u>	<u>Percent Concerned</u>
Accuracy of Output	62
Cost of Operation	54
Confidentiality of Patient Data	31
Management of Administration	31
Legal Question	23

The areas of concern in order of priority are listed in Table 7 by the percentage of respondents. As can be seen, the problems of accuracy and cost were of concern to one-half of the respondents. The fact that only a third of the respondents indicated concern as to confidentiality of patient data is surprising. In view of the nature of the physician's service, it was anticipated that this concern would be much higher among the respondents. The common concerns of all those indicating a potential to subscribe to such a service were those of cost and accuracy.

The phrase, timing considerations, used as identification for this portion of the analysis, is appropriate. As can be seen from the negative nature of the respondents' answers to the proposals of this type of service, timing in terms of promotion, education and installation are extremely critical for the development of a service business of this nature. The existing priority structure of services lends itself well to service development timing and the areas of concern, with regard to the service package, and are reasonably well identified so as to dispel all concern prior to institution of the service package.

Study Conclusions

As stated at the outset, the objective of the survey was to simply obtain a practical feel for the administrative task of the physician. It was felt that the overall objective has been met. Further, the results of the survey can be considered generally representative of the administrative task of the physician in Great Falls, Montana. From the standpoint of the four areas of analysis, the following conclusions can be made.

Product Service: The physician business form is not homogenous from the standpoint of the product or service that is being sold. However, each physician is involved in one of three types of business forms: the sole practitioner, partnership, or corporation. This is the identification that must be applied to the physician with regard to the application of a service of administration. Further, the specialty of each physician is available as a method of more detailed categorization. Through the use of these product-service identifiers, the means of developing a service structure can be accomplished.

Demand/Use: It can be definitely concluded that the physician's "Administrative Task" can be partitioned out of the entire sphere of physician activity and be labeled as such. Significant specific conclusions, with regard to the demand for a service to accomplish this task, must be made on the basis that currently there is no such service offered on a wide basis. Further, each physician, on the average, spends 21 percent of his work week involved with administration of his practice. This alone, if converted to the practice of medicine, could serve as a strong basis for a physician seeking the service. The complete administrative service package must include a broad range of services with specific emphasis on appointment, billing, third party billing, general accounting, and management reports. The specialized services area would be of low interest in system design and should be considered only with regard to system selection and long range objectives.

Pricing Data: Very few specifics could be obtained with regard to pricing. Generally, those that were obtained required further study to determine specific weighing. The fact that a cost separate to the cost of employment could be determined is a major discovery, especially in view of the fact that in all cases, with the exception of surgeons, this cost was not less than 20 percent of the total cost to the physician. With regard to the excepting of surgeons above, a further conclusion that may be reached is that medical specialty has a significant impact on the cost of administration. From the data indicated, the highest per patient cost of administration was in the pediatric and obstetric areas which should serve as an indicator of the type of product the service should be pointing toward.

Timing Considerations: The marketing of a service to accomplish

the physician's administrative task is extremely important. If the respondent's attitude toward this type of a service is an indication of the prevailing attitude of physicians, the selling of the service would have to be accomplished through a very well developed marketing plan that would provide for a sufficient amount of education, orientation, and demonstration. Priority of service programs in the service package should be given to the billing and medical records problem with careful pricing of service and a high benefit motivation as the overall theme of the marketing strategy.

In conclusion, then, it was felt that there was significant evidence made available by this study to indicate that there exists a need for the development of a business that would provide automated administrative services to the physician. Further, this business must be developed in a precise manner, paying close attention to system detail, management philosophy, and marketing programs.

CHAPTER III

THE SYSTEM

General System Concept

Now that a feel for the physician's administrative task and the types of services required to service that task have been established, the construction of the business can be started. The first step in the development of the automated medical administrative services (AMAS) business was to design and develop the system to provide the service. To do this, a discussion of the objective, evolution, building, and the selection of the system was made. It must be pointed out at the onset that the concept being considered is thought to be completely new and, therefore, much of the empirical data for support of the concept is not available. It is because of this fact that little effort was made to establish a sound empirical basis for the system designed. Instead, the approach is from a conceptual point of view, introducing empirical data of similar or partial application only in support of a particular segment feasibility and/or existence.

The purpose of the system design is to provide an automated computer system which can be used by a service business to provide administrative service support that is peculiar to the physician and his administrative tasks. Specifically, a system that would support operations in the following areas.

1. Physician's Appointments
2. Accounting Systems
3. Billing Systems
4. Medical Records Systems
5. Management Analysis Module

As mentioned earlier, empirical data was not available on such a concept, likewise practical application data were not available. Therefore, an overriding theme in the system design was the property of flexibility. In essence, the wheel is being invented, therefore, the system designed must be such that modification and/or revision can be accomplished without having to completely revise the entire systems concept. The ultimate goal in this attribute was to establish a basically sound frame around which addition and deletions could occur without destroying the frame. To achieve that goal, each of the above services was designed as a module of activity. Each module was then tied to the other to form the complete service package.

A final consideration that must be made in the designing of the system was the mode of operation effects. By this what is meant is the effects that the configuration of the business has on the system design. In considering this, three basic modes of operation can be visualized; stand alone, combination, and partial operation. A brief explanation of each of these will suffice to demonstrate the importance of such a consideration.

A stand alone configuration would be one in which the separate and unique business that would be established for the purpose of providing administrative services. In this case, the system designed would be solely devoted to that service and all activity of the business would directly impact the system and, therefore, the design of the system must be such to accomodate the operation.

The combination mode is very difficult to deal with, with respect to the system design. This is so because this mode implies that the medical administrative service is an additional service offered by an already existing business, such as a computer service bureau, accounting firm, or management services firm. In this mode, the system design must take into consideration the possibility of use in areas other than the pure area of medical administrative services. If this mode were possible, then the system must be designed so that the mode could be accommodated. Also, a consideration of service overlap and system scaled economics must be considered to prevent excessiveness in system design features.

The partial operation mode means just what it says. Suppose only a portion of the overall concept is successful as it currently seems in the case of accounts receivable processing.¹ In this case, careful system design would allow modification of the system so that a partial operation mode could be accomplished. This mode requires careful scaling in system design and has direct impact on plant equipment selection. This consideration may be a little premature but it falls in line with the overall flexibility requirement and the module concept previously discussed. This mode must be considered in combination with the previous two modes and considered as a modifier of those modes. The separate treatment here is done so only to reduce the discussion.

¹J. S. Blanchard, "We Bet Our Company on Data Base Management," Datamation, September 1974, p. 61.

Now that consideration has been given to the purpose and objectives of system design, attention is given to the actual development of the overall system concept.

System Design Evolution

The design of a system involves several different ingredients, as is the case with the system design for the automated medical services business. These ingredients are the market, the technology, and the idea. The order is uncertain but, none-the-less, all three are part of what could be considered the evolutionary process of the system design. In discussing the system design evolution of the automated medical administrative services business, attention will be given to each of these areas. First to be considered will be the market.

Usually a system evolves because a business senses a demand for a product and then develops the system to provide that product. In this case the situation is somewhat reversed. That is to say, there did not appear to be a ready made market, as in the case of most service products developed, at least not in the conventional sense. What had to be done was to find out just what the product was as the market saw it. This was the whole point of the Great Falls study discussed in Chapter II. As mentioned in that chapter, the objective of the survey was simply to obtain a practical feel for the physician's administrative task, and thereby a sense of the market to which a service such as this could be applied.

Assuming that the results of the study were typical² of a metropolitan area of the size of Great Falls, Montana, then the following

²Per capita physician ratios indicate a simple comparison for all states. U.S., Statistical Abstract, 1973, p. 74.

definition of the market for the automated medical administrative services could be developed: (A metropolitan area which could support from 200 to 400 medical doctors of various medical specialties. The average physician would be involved in some form of medical collaboration, working 45 to 60 hours a week. He would employ at least two people, a medical specialist and a business specialist, spending from \$10 to \$30 thousand a year for employment and administrative expenses. These expenses would account for approximately 20 to 30 percent of his annual income.) Admittedly, this definition is very general and quite sketchy. However, it will serve to assist in the refining of the system concept as an idea. In dealing with this definition, the market locality is extremely important. This is so for a couple of reasons. First, the service must have a large population, for the segment to which this product would appeal will be very small and, thus, the class of innovators will be small. This is felt very important because of the conservative nature of the physician. Second, the level of technology in the market area must be sufficiently high to insure the required materials and service.

To this point, the profile of the market has been limited to the medical doctor. However, when designing the system, consideration should be given to other potential users of such a service. Specifically, those medical services such as dentistry, optometry, veterinary, and such similar services. What is being suggested here is that possible extensions of the basic market may be important in the growth of the business, and to preclude the extension into these areas simply because of poor system planning would be an error of high order.

As mentioned earlier, the three parts of system evolution are

difficult to order. Since an idea of what services are to be offered and the profile of the typical market have been established, the state of current technology will be briefly examined and contrasted with these established characteristics. The objective here is not to develop an in-depth study of the state of electronic data processing, but merely to establish a general comparison of the technical ideas with the current state of technology. In essence, is the equipment that is needed to do the job currently available? Before a determination of this nature can be made, it is necessary to define the system in technical terms. Therefore, the following technical definition of the system will be used to evaluate the availability of technological support. (A computer oriented system that will provide computational, storage, file management, and analytical functions to selected alpha and numeric words. Input to this system will be direct telecommunicative from source activity or through peripheral device as selected by user. Output of completed data will be in either document or visual display form. Support for medical word processing will be provided by either direct telecommunicative device or by peripheral device and transcription of medical words will be made directly from spoken form to a computer fitted input form. Multiple user support capability must be present.) The definition just given describes about a dozen computer systems currently on the market. The telecommunicative feature has been present for many years as well as an effective visual display that can be located in the customer's office. Systems of this variety are currently in use at numerous hospitals around the country.³ Such systems

³E. K. Yasoki, "Wide Variety of Computer Based Systems Available to Hospitals," Datamation, March 1975, p. 115.

as SHAS⁴ (IBM Shared Hospital Accounting System), State of Missouri Division of Mental Health System,⁵ and Deaconess Hospital System in Evansville, Indiana.⁶ Although these systems do not provide service to individual doctors in their practice, many of those services that are proposed in the system now under consideration are offered to the hospital in which the system is located. Medical word processing is not a completely new concept either and the technology required to provide the service is also available. This is noted in the systems used by "The Little Company of Mary Hospital"⁷ in Evergreen Park, Illinois and the CHAMPS⁸ system at Canyon General Hospital in Anaheim, California. In each of these cases, a method of medical word transcription and processing have been developed and are currently in use.

A more in-depth discussion of equipment and its application will be made in the next section and the examples presented will be sufficient evidence that the current state of technology could support the type of computer system required for AMAS.

Now that a definition of the market and technological requirements has been established, the third element of the evolutionary idea

⁴J. P. Singer and F. A. Retro, "A Case History: Implementation of a Computer Based Patient Accounting System," Computers and Automation, June 1970, p. 19.

⁵R. J. Brewer, et al, "How to Implement a Shared System Teleprocessing Network," Journal of System Management, April 1971, p. 26.

⁶C. J. Ferderber, "A Standardized Solution for Hospital Systems," Datamation, September 1975, p. 52.

⁷"Medical Word Processing Eliminates Staff Paperwork," Infosystems, July 1973, p. 30.

⁸D. M. Corren, "Multiple Minis for Information Management," Datamation, September 1975, p. 54.

will be considered. The efforts here will be to develop a general picture of what AMAS will look like when all the modules of activity are tied together. In developing this pictorial definition, the following areas of activity (modules) will be considered:

- Appointments Module
- Accounting Module
- Billing System Module
- Medical Records Module
- Management Analysis Module

In viewing these areas, consideration will be given to five levels of activity. These areas of activity are exterior (originator) input, processor translation (preparation), interior input, processing and output. These levels of activity can be best seen pictorially, so prior to developing the general definition, the following figure (Figure 2) is offered as a means of explanation of the above five levels of activity. As can be seen from Figure 2, the flow of information is from multiple exterior sources inward toward the processor with selective and multiple output. Such activity is difficult to show on a system diagram, so in order to develop the idea of the flow of information, the level concept has been presented. The processor is the most passive of all levels, for it simply takes information in, manipulates, stores, sorts, and distributes as commanded. The interior input area is a supervisory area of input. It is through this area that the information flow is directed to its final form. This input process is accomplished through magnetic storage devices, recording devices, or other peripheral devices. The exterior input is, of course, the raw data. This data can originate from any number of sources. The output half of the operation provides data to physician, bills to patient or other party, and data to supervise

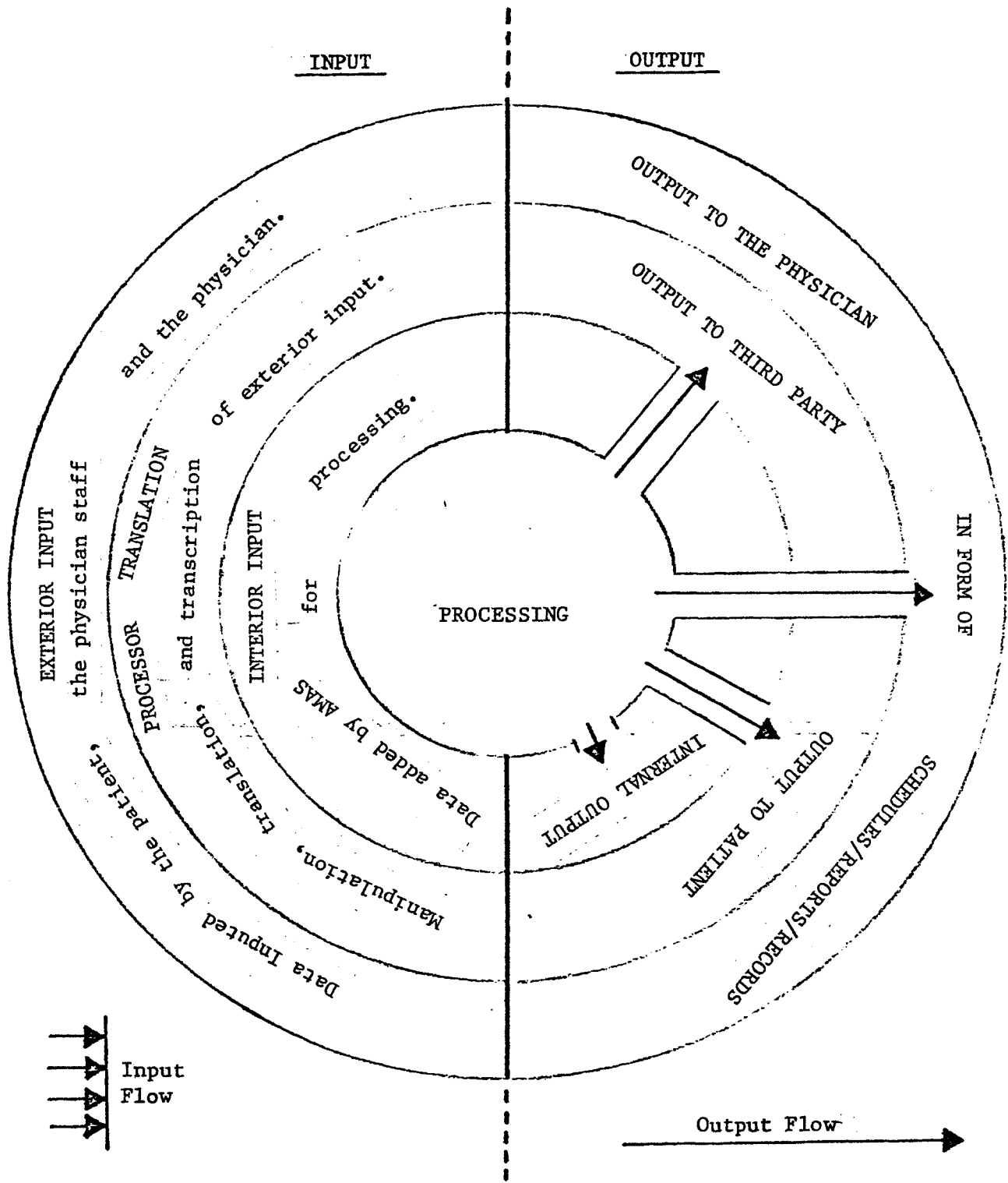


Fig. 2.--Five Levels of Activity.

the system. Now that the information flow has been discussed, the general hardware picture of AMAS is considered. Figure 3 depicts the module hardware requirement as well as the time phasing of inputs.

As can be seen from Figure 3, the central feature of the hardware is the processing equipment. This equipment includes a central processing unit, disk drives, multiplex teleprocessing equipment, diskette reader, and printer. This equipment serves as the hub of the system with the capacity of core and extensiveness of auxillary storage dependent upon the modules of activity applied to the system. The appointments module consists of a bank of telephones and an on-line CRT terminal. The objective here is to have direct access to all physician appointment records for updating as required by patient request. Output is either through an in-office CRT display or by delivered document. The equipment in the billing, accounting and management analysis module consists of a data terminal or off-line data set in the physician's office. The AMAS center equipment consists of data receipt equipment and interim data storage devices. Optional input equipment can be located at the physician's accounting office if the need is indicated. Output will be in both document and electronic storage. Billing will be direct to the payee. The medical records module requires a device for recording either through the use of a telephone or in the physician's office. Once the medical words are recorded, the next step is to input the medical words into the system for processing. Again, output is either document and/or in-office visual display.

At this point, the system evolution process is mature. The market is defined, the technology is available and the basic idea for the AMAS has been established. Attention is now given to the building of the system.

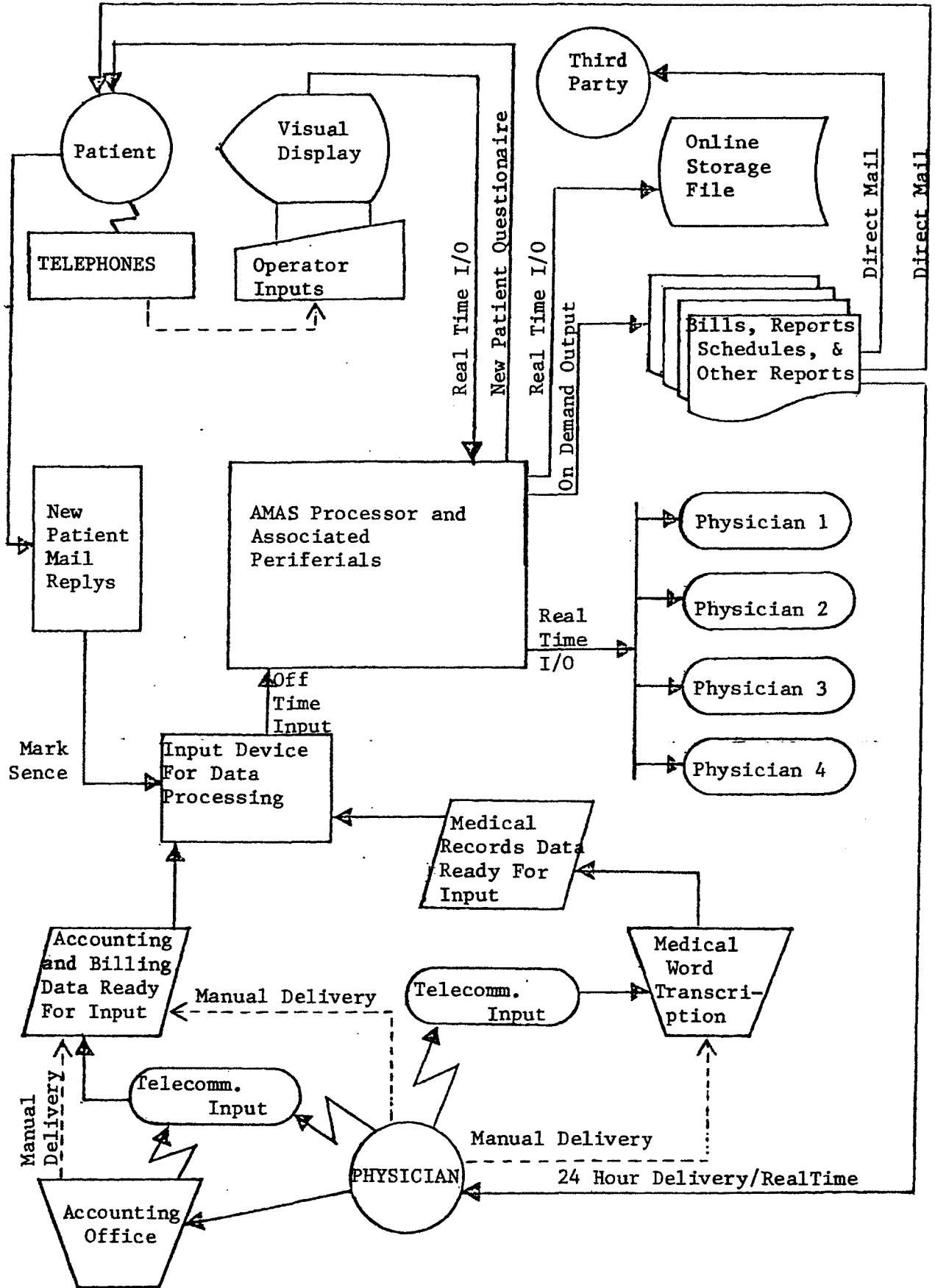


Fig. 3.--General System Idea.

Building Of The System

In dealing with the construction of the AMAS, consideration was given to the outlining of each service module, equipment identification and review and software development. The overall objective of this section is to first establish the service package by detailing the system flow, then matching the hardware to that system flow. The first area to be dealt with is the service module outlining.

As depicted in Figure 3, there are five basic service modules in the AMAS service package. In each case, the service cycle is illustrated through the use of a detailed flow chart. The objective here is to define the actual service that is being offered by each module. The detailing of the action and decision steps of the flow chart of each service cycle serve to reveal the inner working of each service and expand the general system idea that has been presented to this point. The first to be considered is the appointments module through two distinct cycles of action.

Figure 4 represents the first cycle of action in the doctor's appointment service. This cycle outlines the actions required in setting the appointment. In following the action through, the system action is initiated with a telephone call. The patient selects the doctor and finds his appointment number in the telephone book. Upon placing a call to make an appointment, the patient calls the service. The on-duty operator answers the telephone, "doctor's office." The requested appointments are quickly entered into the CRT terminal at the operator work location. The system immediately opens Doctor X's appointment file and makes ready for operator request. The patient requests

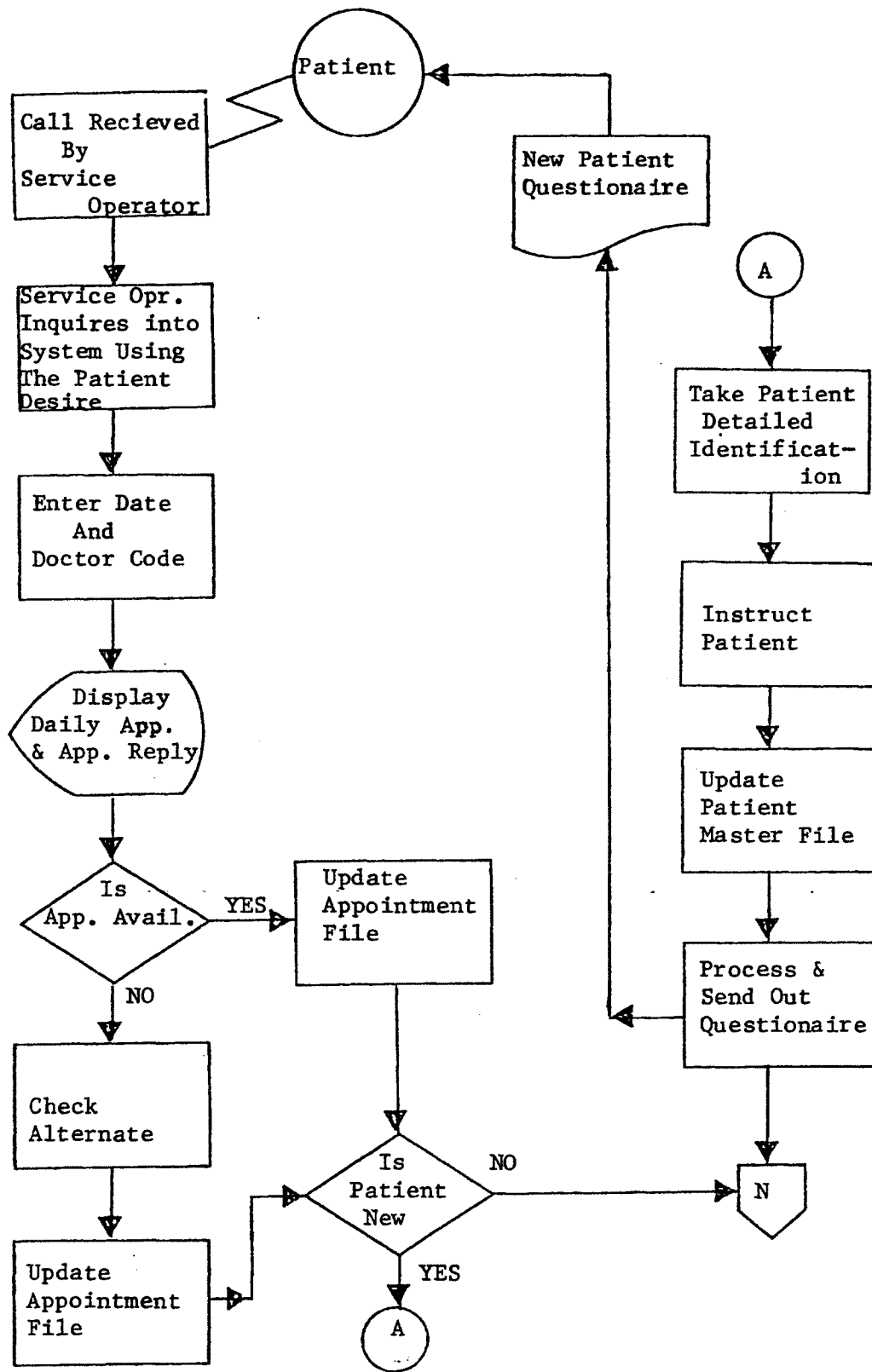


Fig. 4.--Patient Appointment Cycle.

a given appointment, the operator enters the appointment, month/day/hour, (i.e., 03181430, March 18 at 2:30 p.m.). The system displays that day's appointments and a reply message on that hour's appointment. The operator has several options available at this point. He can suggest other appointment times to group appointments, if desired appointment is not available, and can key alternate days for selection. Once an agreeable appointment is reached between operator and patient, the operator automatically sets appointment into memory. At this point, the operator determines if the patient calling is a new patient. If he is a new patient, then a detailed patient identification is taken and keyed directly into the master patient file. At this point, the system then prepares a new patient questionnaire.⁹ This is a printed questionnaire of numerous multiple choice questions, indicating answers on a standard mark-sense answer sheet. At this point, the Patient Appointment Cycle is completed. The next actions in the appointment module involve the appointment record cycle; which establishes the means for the physician to receive appointment data and the "New Patient Questionnaire" processing. Figure 5 depicts the actions in the appointment record cycle. The appointment service which establishes the final appointment record for use by the physician. As can be seen from Figure 5; there are two methods available to the physician. If the physician chooses, he may use either or both of the delivery methods. The objective here is to provide both expedient service and a range of cost for the service. The auto delivery method would tie in best if other

⁹This questionnaire is like the concept presented in H. A. Haessler, "Recent Developments in Automating the Medical History," Computer and Automation, June 1969, p. 24.

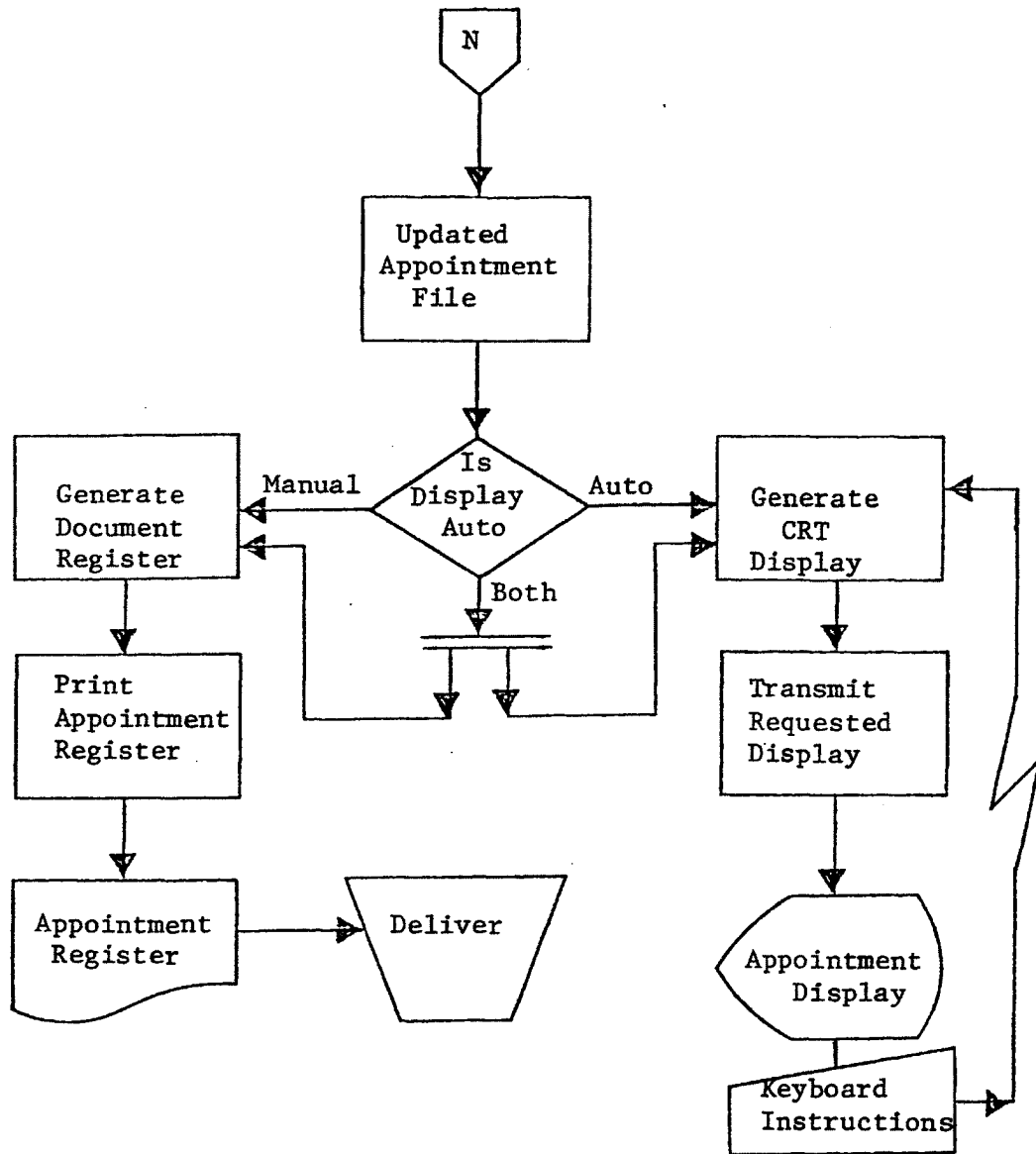


Fig. 5.--Appointment Record Cycle.

AMAS services were purchased, thereby making the appointment auto display more cost effective. The displayed appointment's register, whether in document or CRT display form, would include such items as follows:

- Patient Name
- Patient Age/Sex
- Reason For Appointment
- Primary Doctor (Listed If Group Practice)
- Person Responsible For Payment and Relation
- Current Balance
- Date/Time Of Appointment
- Patient ID For Medical Records Access

The CRT display would be continuously updated and would reflect that moment's appointment situation. The document form would be current as of 5:00 p.m. the day prior to that day's appointments. The appointment module programming would allow for physician inputs to restrict or tailor appointments to the individual physician's desires. If the physician wished to set an appointment for one of his patients, this could occur directly from the office. If a CRT terminal were used by the physician, then appointment scheduling could be accomplished by using the on-line system. If this feature were not available, then a telephone call to the AMAS appointment operator would be all that was needed to set an appointment.

As shown in Figure 4, each new patient would be sent a new patient questionnaire. This is the first step in the development of the patient medical record. The objective of the questionnaire is to provide a reasonably complete and available patient medical history. The ultimate goal is to provide the history prior to the patient's first appointment. In any case, this history would be included as a part of

the record. Haessler¹⁰ points out several different methods of automating medical histories. Using these basic ideas and methods, a tailored procedure could be adapted to the AMAS. As mentioned earlier, these questionnaires are generated as part of the appointments cycle. The mailed questionnaires would be complete with instructions, questionnaire, answer sheet and return envelope. Once the patient completed and returned the questionnaire to the service, it would be processed through a mark-sense reader and directly input into the computer, where sentence fragments and answers are grouped to form a report that would simulate the type an intern might write.¹¹ Again, the output is available in both CRT and document methods. This history is the first record in the patient's medical file. The processing and output of patient medical history is depicted in Figure 6. As can be seen from the discussion of the medical history questionnaire processing, the automation of patient medical records is an integral part of the AMAS service package. The discussion of the questionnaire is only one small part of the medical records module. The objective of the AMAS medical records service is to provide the physician a method whereby he can document medical findings during or immediately after patient examination. The method of documentation will be through the use of various recording methods. In order to reach the desires of the various physicians, several input and output methods are available to choose from. In general, the medical records system involves the following basic actions, as depicted by Figure 7. The input of medical record data (medical words) is accomplished through four basic methods. However, once the

¹⁰Ibid., p. 24.

¹¹Ibid., p. 26.

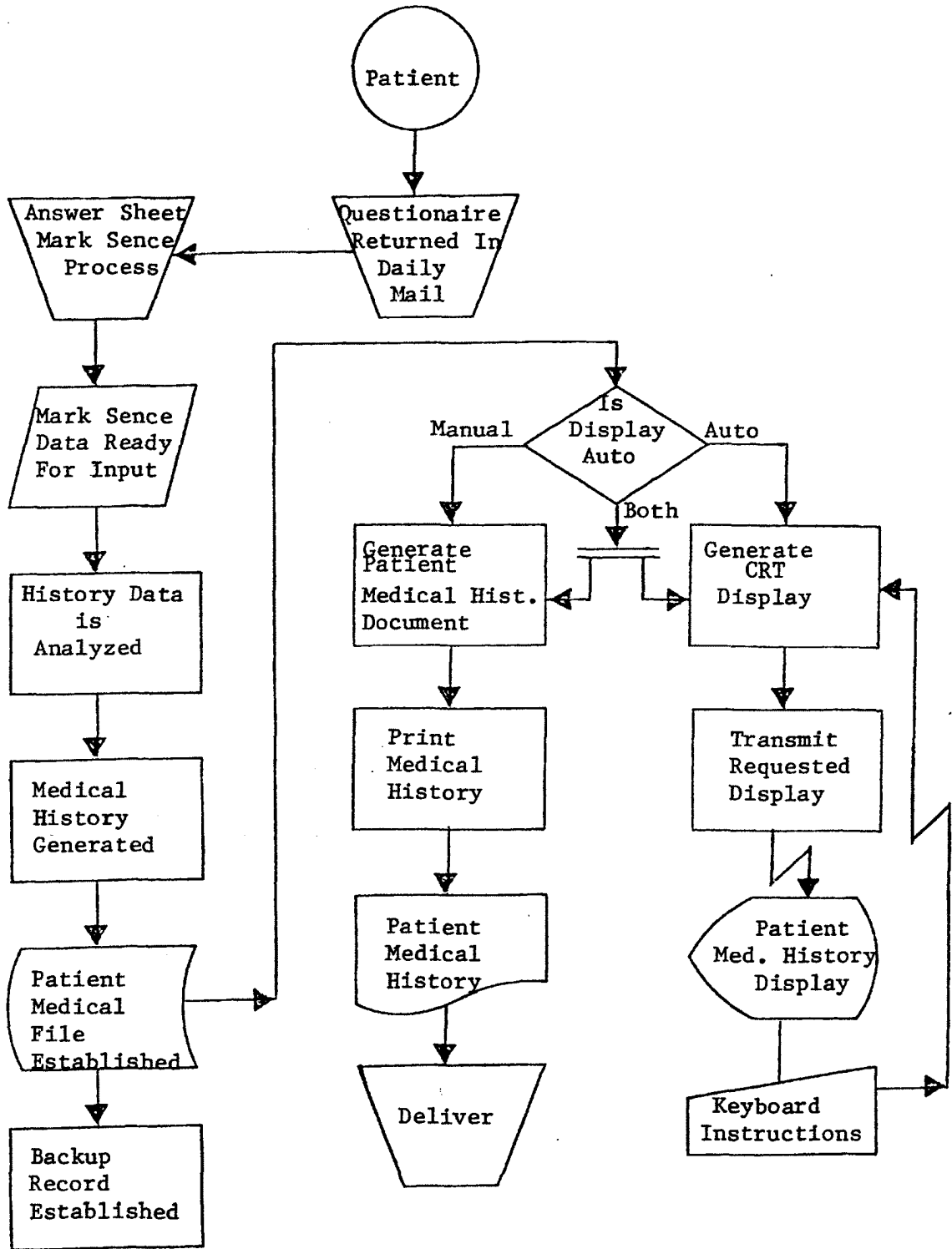


Fig. 6.--Medical History Questionnaire Processing Cycle.

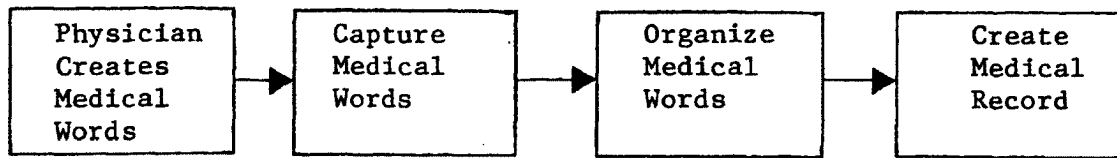


Fig. 7.--Medical Records General Actions

medical words have reached the stage at which they are ready for processing, the actions of the system are the same, regardless of the type of input option used. Figure 8 depicts these four options.

In all options shown in Figure 8, the physician creates the medical words. The statistical data gathered by the physician's staff, a part of the record, may be included as part of the words or may be input separately. Once the physician is ready to document the data, he, in all options, records the data electronically on a recording device. It is at this point, that the options are differentiated.

In Option I, the physician records the data on a desk recording device. At pre-determined times, the AMAS pickup person picks up these tapes for delivery to the AMAS center. When processing is completed, the tapes are returned or filed at the center as source documents.

In Option II, the physician staff, using an on-line terminal, inputs the recorded data directly to the processor input point. Again, the original tapes are retained as source documents.

Option III is similar to Option II in that the physician staff enters the data, in this case, on a diskette. Once accomplished, the data is then either transferred to AMAS via telecommunication or the diskette is delivered. Tapes are kept as source documents.

In Option IV, the physician calls directly to the AMAS center

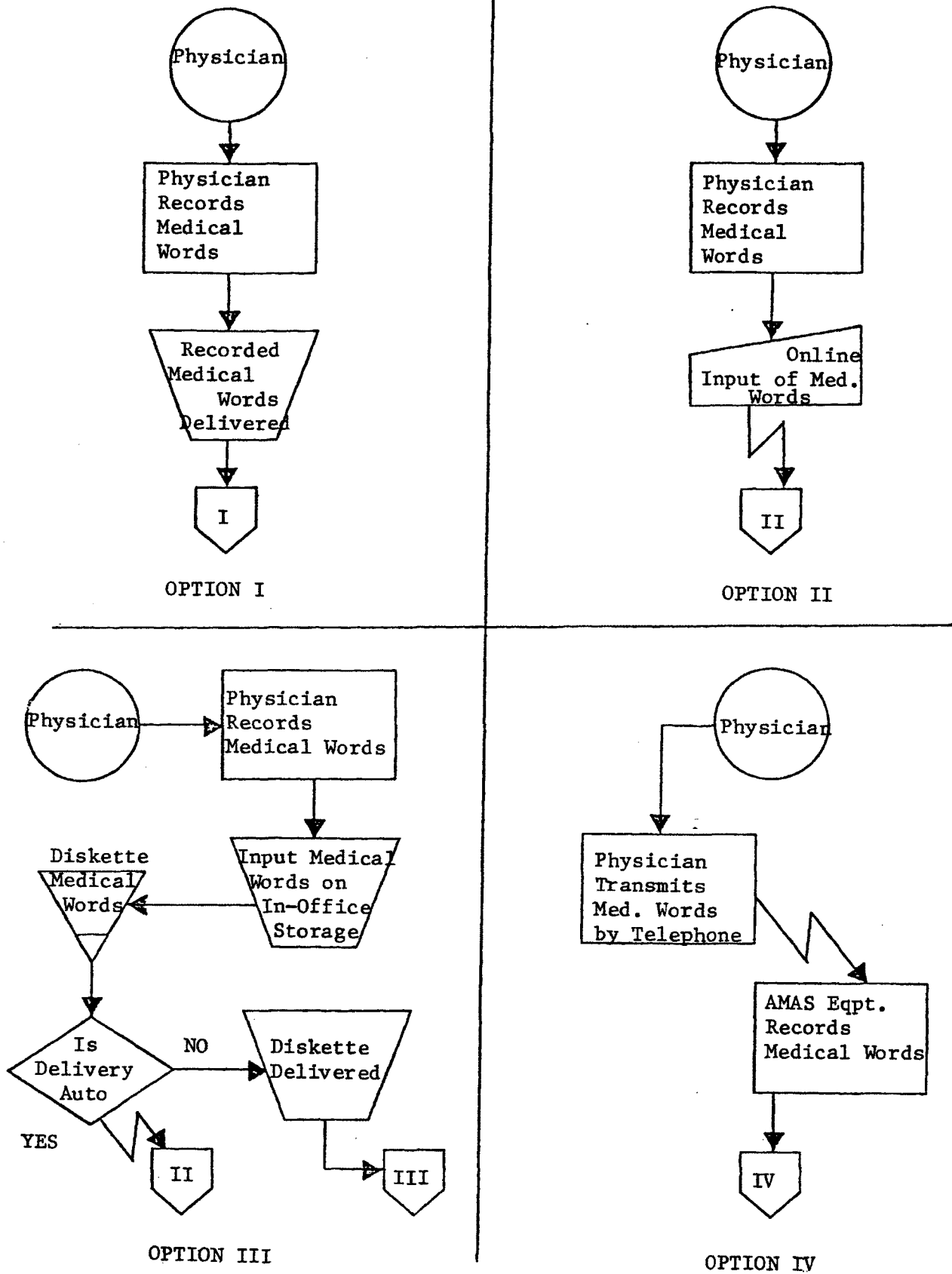


Fig. 8.--Four Input Options for Medical Records Processing Cycle.

and records the data onto AMAS recording equipment. This is a useful option in that medical records can be established from any telephone.

Each physician can use as many of the options as he desires. For example, the physician may desire to have the CRT unit installed in his office and use this method (Option II) for all office calls and use Option IV when visiting patient in home or hospital. Of course, there is always the fifth option of not using any of these methods. This, too, is a viable option and, under the module concept, will not prevent the physician from using other aspects of AMAS.

The completion of the input portion of medical records processing is shown in Figure 9. The roman numeral shows where each of the four options enter in the processing cycle. Once the tapes are delivered (Option I), the AMAS inputs the data using CRT on-line methods. Option IV is completed the same way. The completion of Option III, if auto delivery is not used, is accomplished by the reading of the diskette directly into the input storage area. In all cases, the final step of the input operation is the insertion of the medical data directly into the input storage area. In the case of Option II, this is completed by the office staff of the physician, using the on-line method. The remaining portion of Figure 9 describes the processing and output steps of the medical records processing cycle. As in the appointments cycle, the medical records cycle also offers both document and CRT display output.

The resulting output medical record would be tailored to meet the needs of the physician. Statistical data entered for the patient would be incorporated with the medical words and included as part of the patient file. In either output method, the file would reflect the

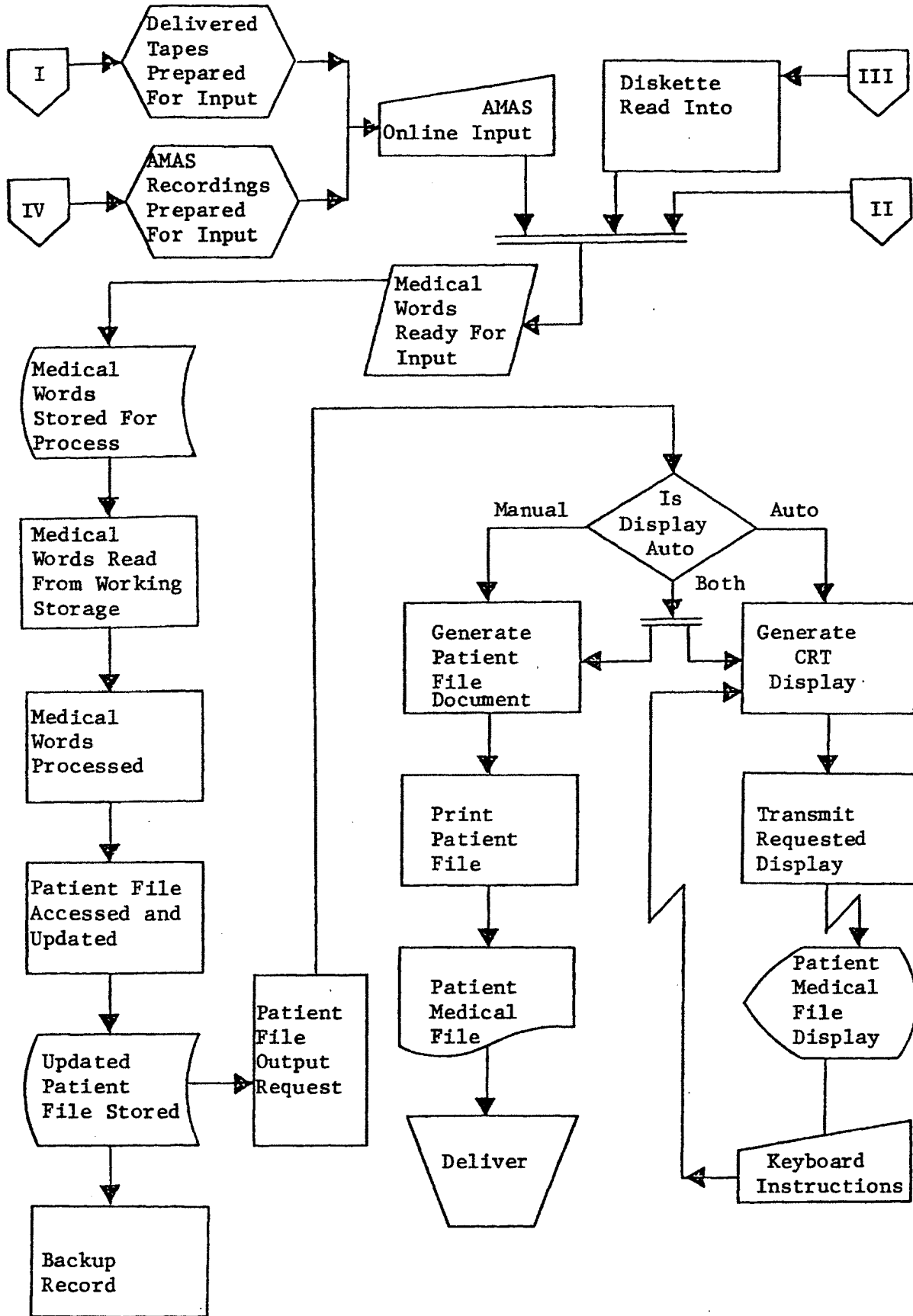


Fig. 9.--Medical Records Processing Cycle.

same data. In the document method, the patient file would be updated that processing day and, within 36 hours, the new patient file would be delivered to the physician for inclusion in his office files. In using the CRT display method, the file would be instantaneously updated and available for review and use immediately. In both instances, the file would include medical dialogues, updated histories and ordered charting or analysis. Additionally, laboratory data could be entered by resident laboratories if data entry devices were installed. Other laboratory data would be entered by any of the options discussed or by AMAS operators, if AMAS was provided laboratory data results. These data could be analyzed, if required, and then included as part of the medical record. This processing is after the fact and should not be confused with laboratory analysis which is not part of the AMAS basic service package.

The more strictly business functions of the physician's administrative task are those of accounting, billing and management analysis. Each of these areas will be offered as specific service and, thereby, will be considered as a separate service module. However, much of the data from one area may be useful in the other areas, and the processing of all accounting type data can be considered contributive to the resulting management analysis. Therefore, in outlining the accounting, billing and management analysis, three cycles of activity have been considered. These cycles are:

1. Input Billing/Treatment Data Cycle
2. Billing/Treatment Data Processing and Output Cycle
3. Accounting Cycle

The resulting outputs from these three cycles of activity yield the three services of Accounting, Billing and Management Analysis. Before going

into the discussion of these three cycles of activity, a definition of the "Billing/Treatment Data" is necessary. This phrase is used to describe the resulting data from an office visit by the physician's patient. Included in these data are the following items:

- Patient I.D.
- Diagnosis
- Treatment Abstract
- Physician Attending
- Service/Fees
- Party to be Billed

These data would be collected on a worksheet that would be used by the physician staff or the AMAS staff to input the data into the AMAS system. An example of this type of worksheet is shown in Figure 10. This worksheet would be completed in multiple copies. Retaining one copy for source document files, using one for data input and the remaining as required by the individual physician. It is through this worksheet that the bulk of the accounting data are input to the system. Discussion of the remaining aspects of the accounting service are discussed upon completion of the considerations of the billing service offered by AMAS.

The primary objective of the automated billing system is to reduce the receivables turnover time and effect direct and complete billing procedures. In the process of doing this, data are collected so as to enable the physician or physicians to assess the practice that is established. This is of particular interest to the group practice, in as much as the individual physicians in the practice are provided reports that will show each member's contribution to the overall practice. The procedures that would be followed to produce these service products are included in the "Input Billing/Treatment Data Cycle" and the

Time: _____	DR. JOHN J. DOE P-3714	Date: _____
Patient Name: _____ ID #: _____		
Third Party Information	Inst: _____	
	Claim #: _____	
	<input type="checkbox"/> Medicare <input type="checkbox"/> Personal <input type="checkbox"/> Other: _____	
Diagnosis: _____ _____ _____ _____		
Service #1:	_____	Fee: \$ _____
Service #2:	_____	Fee: \$ _____
Service #3:	_____	Fee: \$ _____
Service #4:	_____	Fee: \$ _____
Service #5:	_____	Fee: \$ _____
Doctor Signature: _____		
(For more than 5 services use additional form.)		AMAS Form B-1

Fig. 10.--AMAS Billing/Treatment Data Worksheet.

"Billing/Treatment Data Processing and Output Cycle." Using the definition of billing/treatment data and the worksheet just established, the discussion of the input cycle is accomplished. As in the other service modules, this has been accomplished partly through flow charts. As in the case of medical records, there are several input options, in this case three, as shown in Figure 11.

As in the case of medical records, all options, as shown in Figure 11, begin the same way and that is through the development of the Billing/Treatment Data Worksheet. It might be pointed out at this point, that these worksheets are initiated by the physician's staff and require only the physician's signature to verify the data as entered by his staff. The next step in the input is the point where the three input options are differentiated.

Option I is a completely manual system. The worksheets are filed in a central receptacle for pickup. At a predetermined time, the AMAS pickup person picks up these worksheets for delivery to the AMAS center.

In Option II, the physician's staff, using an on-line terminal, inputs the worksheet data directly to the processor input point. No other data handling is required in this option.

Option III is similar to Option II in that the physician's staff enters the worksheet data. In this case, the entry is on a diskette. Once accomplished, the data are then either transferred to AMAS via telecommunications or the diskette is delivered.

The completion of this cycle of activity is shown in Figure 12. The roman numerals show where each of the three options enter in the cycle. In all options, the completion of the input option is the insertion

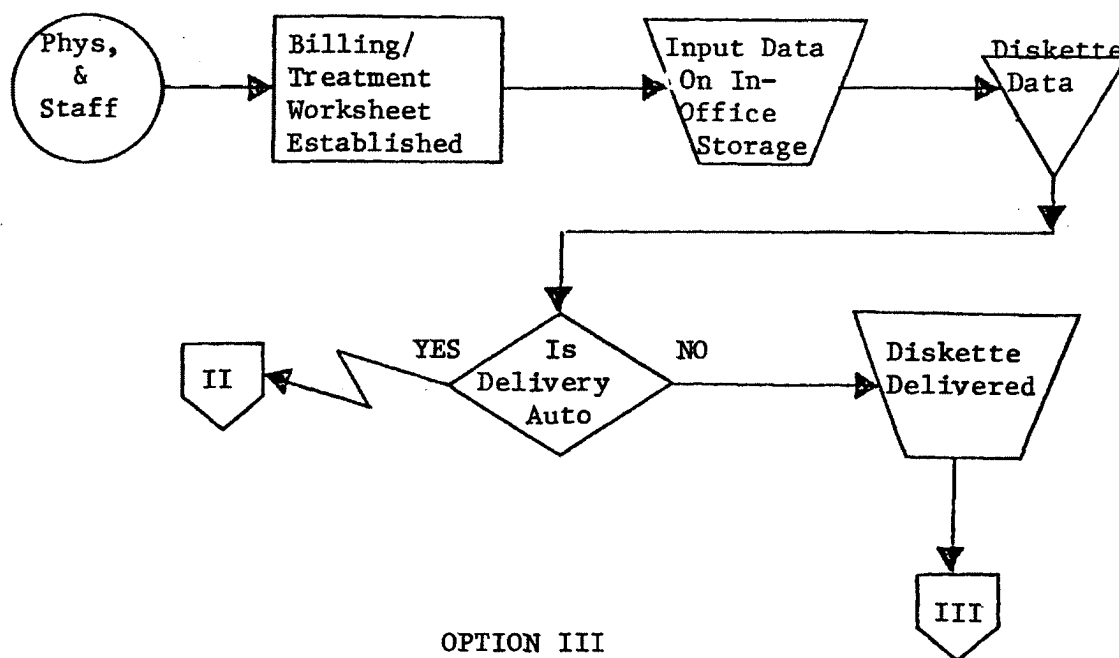
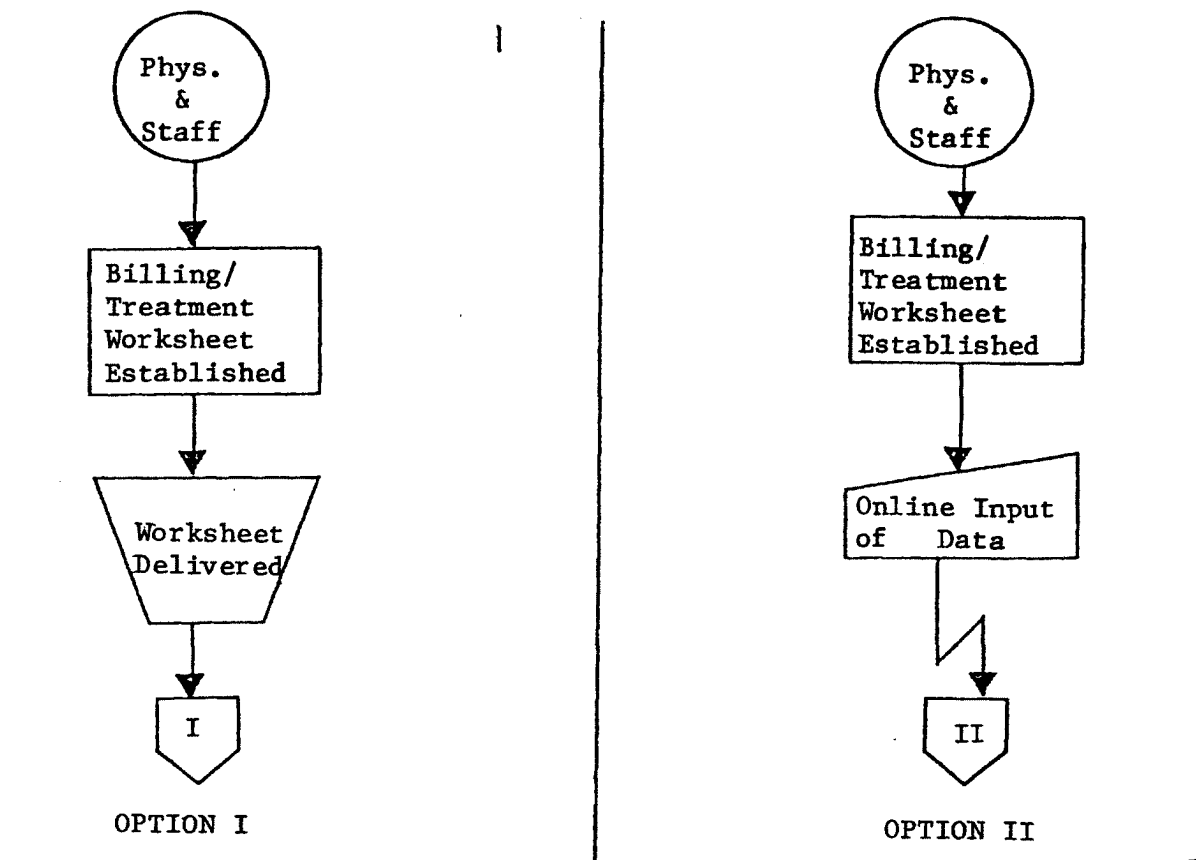


Fig. 11.--Three Input Options for Input Billing/Treatment Data Cycle.

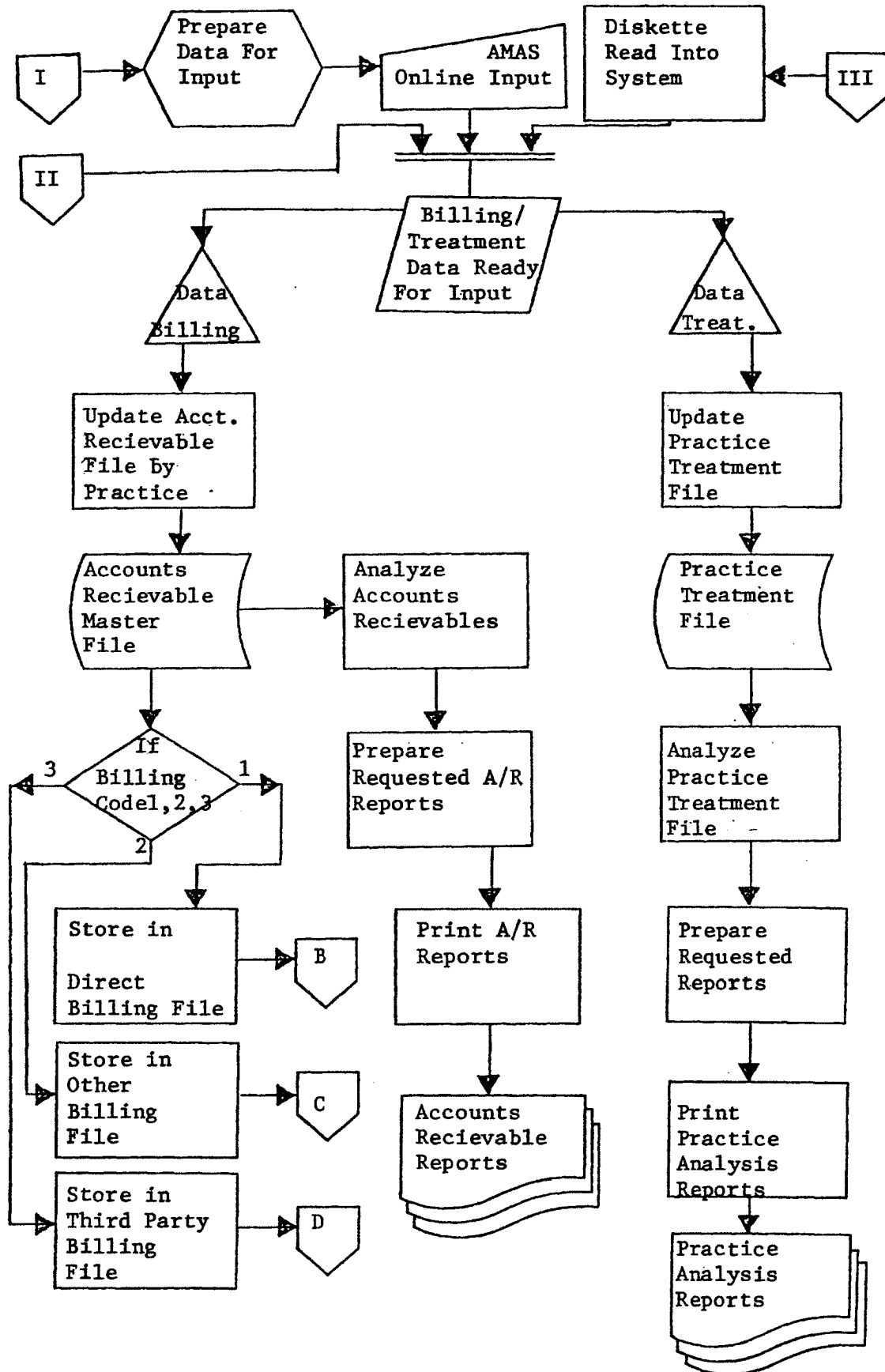


Fig. 12.--Billing/Treatment Data Processing and Output Cycle.

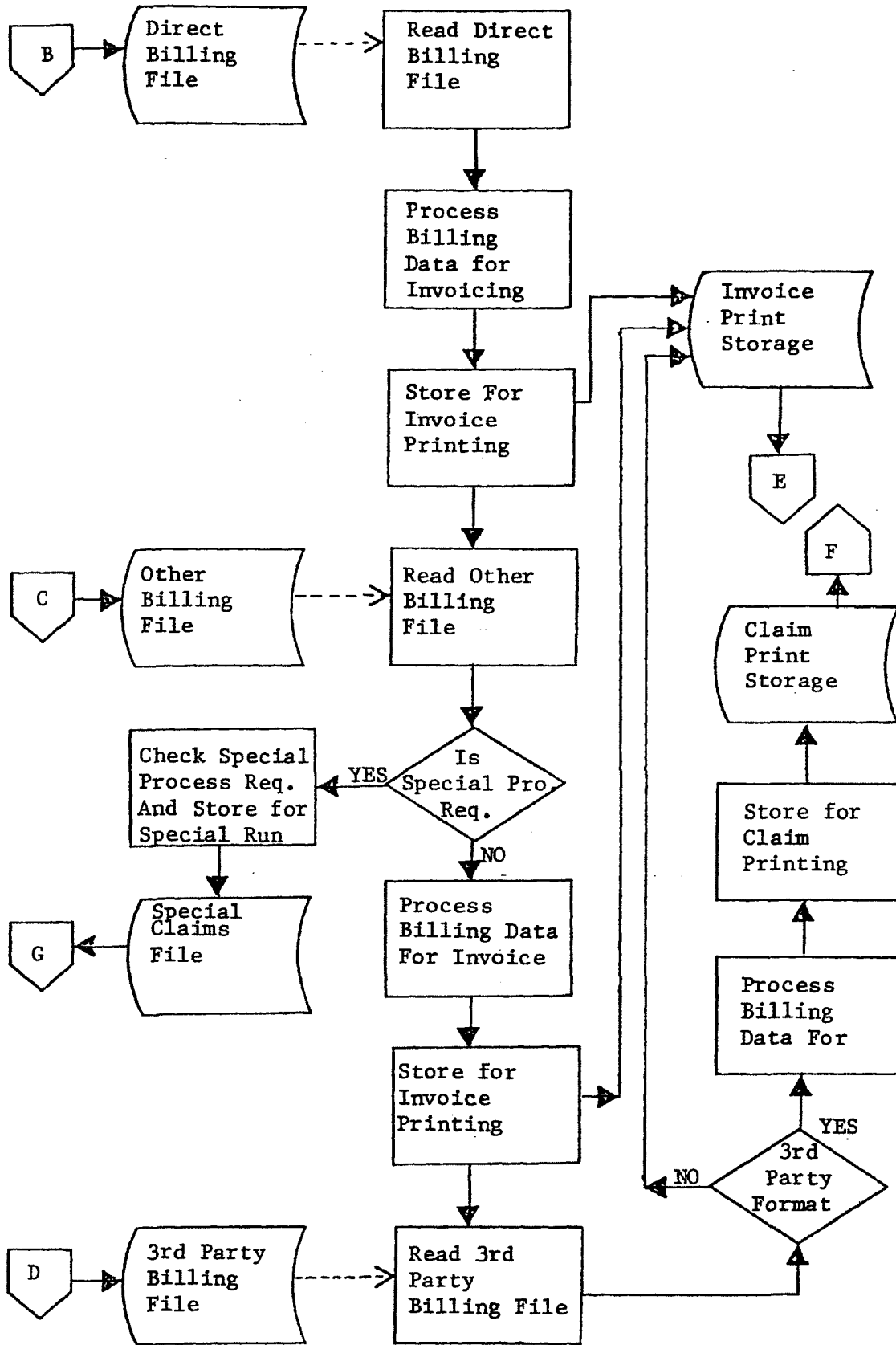


Fig. 12.--Continued.

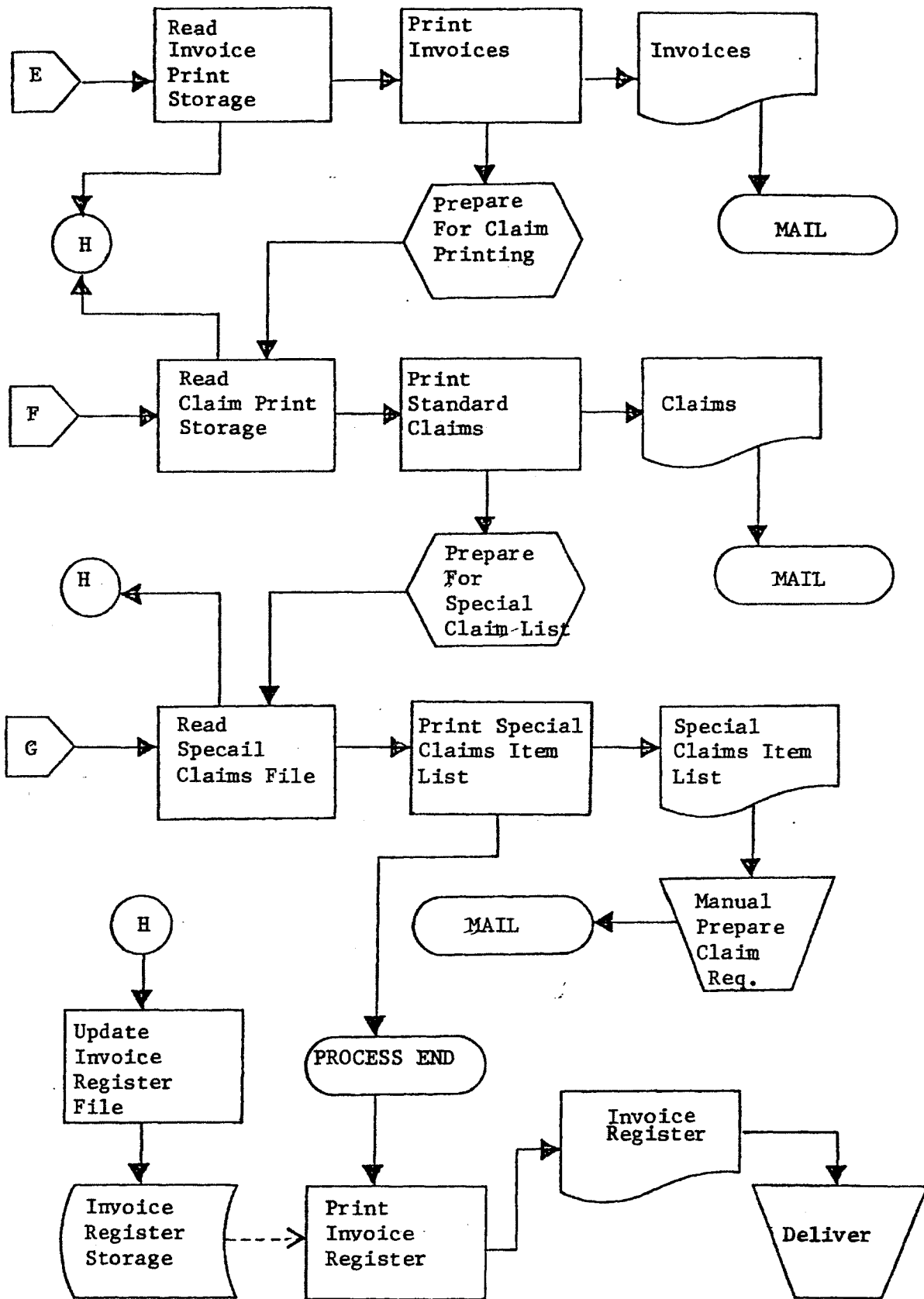


Fig. 12.--Continued.

of the data directly into the input storage area. In the case of Option II and auto Option III, this is done by office staff.

The flow charts of the Billing/Treatment Data Processing and Output Cycle (Figure 12) are self explanatory, with regard to the procedures to be followed. It must be noted that the process action blocks are general in nature and are intended to be inclusive, with regard to master file update, indexing, search and functional calculation and analysis.

By way of summary, the output from this module is as follows:

1. Bills to Individual Patients
2. Bills to Third Party Institutions
3. Claims to Government Health Agencies
4. Accounts Receivable Reports
 - a. Aged
 - b. Status by Guarantor
 - c. Forecast Reports
5. Invoice Registers
6. Practice Analysis Reports
 - a. Physician Activity by Diagnosis
 - b. Physician Activity by Procedure
 - c. Physician Activity by Other Indices

As can be seen, there is an extensive number of products offered by this service, using a limited data input. This is possible due to the extensive initial data capture at service startup, as well as the continuous patient and practice file updates. This repositioning of data eliminates manual research and documentation of data at each patient visit and, hence, reduces the physician administrative task immensely.

Depending upon which input option that the physician chooses, the time lapse from the moment of treatment to the point of mailing the bill will vary from eight to thirty-six hours. If Option I input is used,

the turnaround is the longest, due to the manual character of the procedure. If the data is input by Option III manual, then the process turnaround is improved, in view of the lack of data preparation. Options II and III-auto provides the shortest turnaround. The real time on-line input makes possible the mailing of any bill to any source, the same day that it was created.

Continuous monitoring of receivables and a follow-up reminder and billing program are provided in accordance with the wishes of the individual physician. Accounts receivable reports provide the required input to the physicians to manage this portion of the service.

With the short process turnaround time and the continuous monitoring of receivables, the anticipated result would be to see a reduction in receivable turnover. Additionally, the establishment of this data base provides for a significant input to the accounting cycle.

The accounting cycle activity in the AMAS is probably the most difficult service procedure to discuss. This is so, due to the suspected nonuniformity of individual physician accounting practices. Therefore, in outlining the AMAS accounting services, the extent of data input and the type of service desired will be assumed complete to provide an adequate picture of the accounting job.

The basic objective in the development of the accounting cycle is to develop a broad spectrum of accounting services and products. This will be accomplished through the use of automated bookkeeping, which will generate the required financial statements and documentation to allow for an independent accountant or an AMAS staff accountant to prepare tax data and other business related documents. In doing so, the following items have to be established.

1. Base Accounting Data
2. Structured Chart of Accounts
3. Payables Entry
4. Receivables Entry
5. Other Accounting Data Entry

The input methods for data used in the accounting cycle is the same as those used in the billing/treatment data cycle. The only difference is in the input codings and delivered documents. The general structure of the flow in this cycle of activity is shown in Figure 13.

The majority of the accounting process work is accomplished in off time periods. This may be done to accomodate the real time on-line activities. If the demand is present, it is also possible to access accounting files for display on real time CRT output devices in the physician's office. Normal output of data is generally through the use of printed documents. These documents are produced in multiple copies, so that each member of the practice may be provided a copy of journals and reports, as well as the accountants of the physicians. The general operation concept of this service is to provide bookkeeping data and reports for use by the individual physicians and their accountants.

In summary, the output from this module is as follows:

1. Financial Statements
 - a. Balance Sheet
 - b. Income Statement
 - c. Funds Flow
2. Account Ledgers
3. General Journals
4. Payroll
 - a. Summaries
 - b. Employment and Compensation Records
 - c. Check Writing

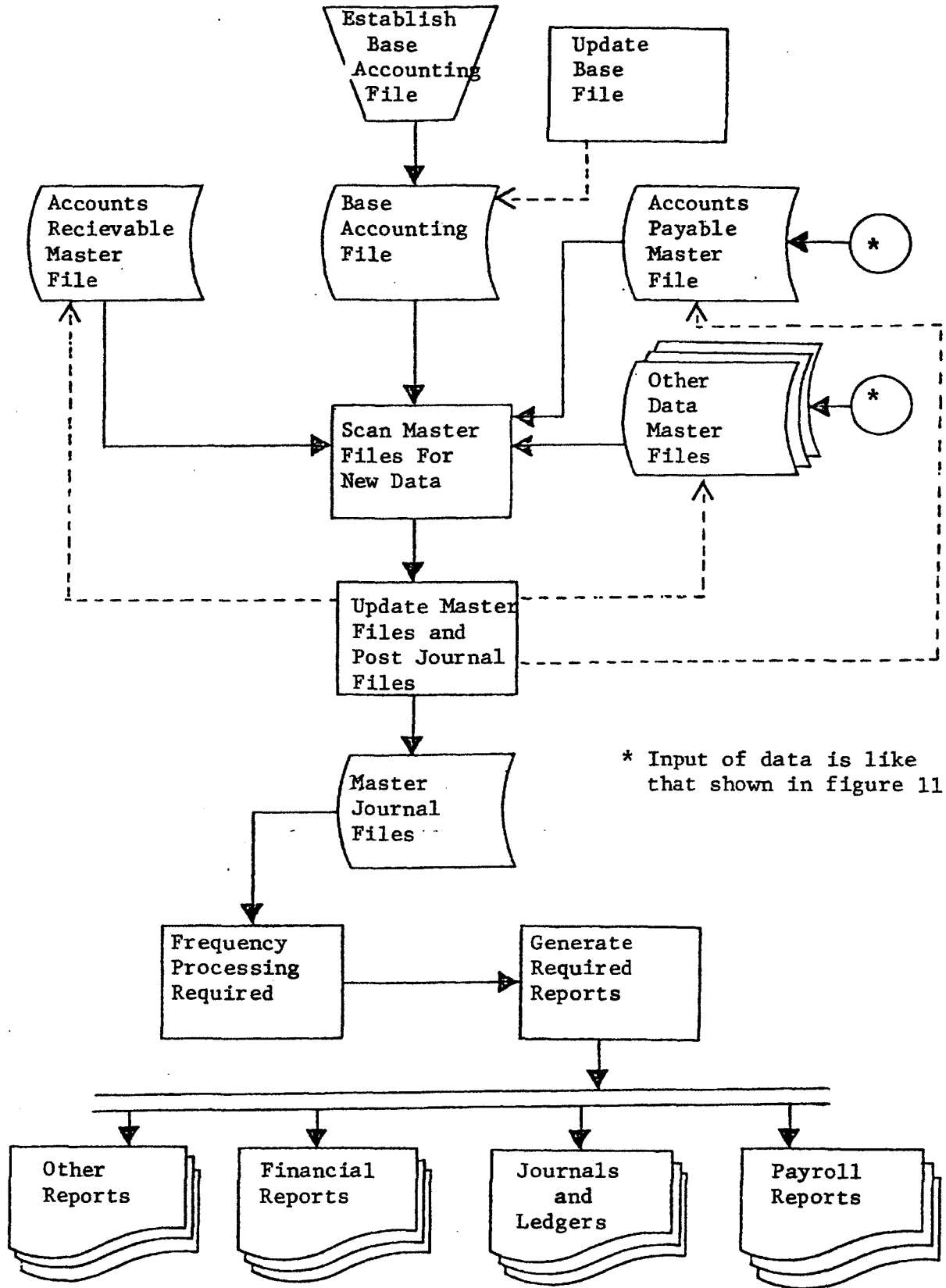


Fig. 13.--Accounting Cycle.

In addition to these normal products, the accounting module is able to provide specialized services that are peculiar to the physician in the areas of:

1. Malpractice Insurance
2. Licensing Requirements
3. Financial Analysis

As in all the other services offered by AMAS, the idea of flexibility is a central theme in the accounting module. Each subscribing physician would be able to use as much or as little as he feels is necessary or desirable in the conduct of his practice of medicine.

At this point, a complete discussion and outlining of each of the five service modules has been accomplished. From the general system idea presented in Figure 3, each of the AMAS services has been outlined in detail with respect to the service procedures and activities. The next step is to examine the equipment requirements to meet the services defined.

The approach used here is to first list the required equipment needed to provide the service proposed by each activity module and then provide identification of equipment that is currently available on the market to accomplish such activity. This identification should not be confused with selection. The objective is to determine if the required equipment is available to provide the support proposed by the system design. The end result is a table listing module activity, required capabilities, required technology and examples of available equipment. The five service modules were considered and the processing and output functions also was addressed in Table 8 as a module, even though these aspects are an integral part of the other modules. The treatment of

each of these areas separately simplifies the development of the table and completes the service package technology requirements survey.

Key to Table 8:

1. Required Equipment Column

P = Physician Office Requirements

P* = Physician Office Requirements (Optional)

I - IV = Input Options

S = AMAS Center Requirements

1 - 6 = Equipment Item Requirements

2. Required Capabilities Column and Example Column

I - IV = Corresponds to Option

(-) = Item Requirement

The intention of Table 8 was not to be an exhaustive listing of equipment. As mentioned earlier, the survey of available equipment would be brief. The objective, however, has been served. For each service and each activity there can be found one or more sources for equipment. If desired, each area could have been detailed by manufacturer and with a reasonable amount of assurance, each could have provided a comparable piece of equipment. The intention here was not to provide a study of the computer vendors, but merely to obtain an indication of the difficulty of matching idea with equipment. At this point, it appears that there would be little difficulty of translation from idea to the actual equipment.

The final area to be considered in the system construction process was the development of software. With respect to the software problem, there are two basic types of software to be considered. They are: (1) System Supervisory, and (2) Operational.

TABLE 8

AMAS EQUIPMENT SPECIFICATIONS & REQUIREMENTS

SERVICE MODULE	REQUIRED EQUIPMENT	REQUIRED CAPABILITIES	EXAMPLE
Appointment Module	P.* CRT Display and Keyboard	-Cathode ray tube, Programmable cursor 6-12 line 40-80 char.	-Saunders - Visual Display Terminal, VT-50 DECscope, Digital
	S.1 Same as above and 2 Multiple line phone work station	-Same as above -Provide multiple call-in with recorded message.	-Same as above - Bell system Appointment Service
Medical Records Module	P. I. Dictaphone II. Communications Terminal III. Diskette data Entry IV. Telephone	I. Standard Dictation II. Continuous mechanical input used in conj. with CRT if desired III. Entry of data on flexible disk unit. IV. No special requirements	I. Numerous II. IBM 2740 Comm. Terminal, Saunders Transactor, Digital LA-30 DECwriter III. IBM 3740 Series IV. Bell System
	S.1 Telecommunication Receiver Equipment 2 CRT Display and Keyboard 3 Automatic Recording Units	-Able to receive data from several physicians and activities for simultaneous input. - Cathode ray tube, Programmable cursor 6-12 line 40-80 char. - Receive physician phone calls for medical word processing.	-IBM 2700 Series equipment, Dec 2780 Comm. Package -Saunders - Visual Display Terminal, VT-50 DECscope, Digital - IBM PBX recording units.

(CONTINUED)

TABLE 8 (Continued)

SERVICE MODULE	REQUIRED EQUIPMENT	REQUIRED CAPABILITIES	EXAMPLE
Medical Records Module (cont.)	<p>4 Transcription of recorded data for system entry.</p> <p>5 Diskette Reader</p> <p>6 Marksense Processor</p>	<p>- Selective and pre-programmed data entry development</p> <p>- Direct or over comm. lines entry of diskette data.</p> <p>- Read marksense answer sheets and prepare mag. tape collection for entry.</p>	<p>- IBM (MT/ST) units Magnetic Tape Selectric Typewriter</p> <p>- IBM 3540 Diskette Input/Output Unit.</p> <p>- IBM Marksense reader</p>
Billing System Module	<p>P. I. No Equipment Req.</p> <p>II. Communications Terminal</p> <p>III. Diskette data Entry</p>	<p>I. None</p> <p>II. Continuous mechanical input used in conj. with CRT if desired</p> <p>III. Entry of data on flexible disk unit.</p>	<p>I. None</p> <p>II. IBM 2740 Communications Saunders Transactor, Digital LA-30 DECwriter</p> <p>III. IBM 3740 Series</p>
	<p>S. 1 Telecommunication Receiver Equipment</p> <p>2 CRT Display and Keyboard</p> <p>3 Diskette Reader</p>	<p>- Able to receive data from several physicians and activities for simultaneous input.</p> <p>- Cathode ray tube, Programmable cursor 6-12 line 40-80 char.</p> <p>- Direct or over comm. lines entry of diskette data.</p>	<p>- IBM 2700 Series equipment, Dec 2780 comm. Package</p> <p>- Saunders - Visual Display Terminal, VT-50 DECscope, Digital</p> <p>- IBM 3540 Diskette Input/Output Unit.</p>

(CONTINUED)

TABLE 8 (Continued)

SERVICE MODULE	REQUIRED EQUIPMENT	REQUIRED CAPABILITIES	EXAMPLE
Accounting & Management Reports Modules	P. Same as Billing Module	- Same as above	-Same as above
	S. Same as Billing Module	- Same as above	-Same as above
Processor Section	S. 1Central Processor 2Periferal Control Devices 3Storage Devices	- Processes all data and controls system. -Control storage devices and periferal input and output devices. - Stores all files and Records.	-IBM, CDC, Burroughs, or DEC Systems. etc. -IBM 2800 Series, DEC RS-11 - IBM 2300 Series
Output Section	S. 1Printer Device	- Print documents, bills, payroll etc.	-IBM 1403, DEC LP-11

In the first case, little in-house consideration has to be given. The system supervisory programming is the system vendor's responsibility. The considerations to be given to this type of programming are only in defining the system capabilities well enough to allow for the vendor to configure the system. By no means should this aspect of the software be given light treatment. On the contrary, careful consideration is necessary, for without a superior supervisory program, any efforts at operational programming are severely handicapped.

The area of software development that is of primary importance to AMAS is the operational programming. It is this area of programming that shapes the entire AMAS service. The intention here is to briefly discuss this type of software development with respect to development philosophy and concept.

The first concept to consider is, what could be referred to as, "the one serves all concept." In this concept, the idea will be to establish base programs that will serve all users. In essence, each service procedure will be dissolved into a common set of procedures and actions. The end result in the implementation of this concept is the central operational program for each of the five service modules defined. The operation of these programs is through the use of a series of director programs. This set of programs may appear to be supervisory in nature, and they are. But care should be taken not to confuse this set with the equipment supervisory programs. The director set controls other programs whereas the supervisory set controls the system in total.

It is through the use of the director program set that the tailoring of service is accomplished. When speaking of tailoring, generally what is referred to is the output or final product. In using the

director set, selective print routines and other output tailoring procedures can be accomplished with ease.

Additionally, AMAS provides limited programming for specific client specialized studies or services. The programming support is limited to this area and is considered AMAS property. It is through this area that possible service lines could be established.

A final area to be considered is that of software purchases. Many computer vendors offer application programs, such as "IBM, Industrial Application Programs." In reviewing these types of software resources, care will be required to insure that such packages provide the type of service to be offered. Return on investment and alternative sources should be an underlying theme in the purchase of software. If the software can be purchased to do the job at a cheaper rate than it can be developed, then that is what should be done.

System Selection Process

The final area to be discussed, with regard to the AMAS system, is the process of system selection. The actual selection of a system will not be made in this discussion, but what will be accomplished is the development of an outline of activities to follow in the selection of the AMAS system or any other system, for that matter.

Currently, there are numerous computer companies to look to for the equipment that would be required. For example, in the case of stand-alone small business systems, Stiefel¹² reviews 28 different manufacturers

¹²M. L. Stiefel, "Small Business Computers," Mini-Micro Systems, July 1976, p. 51.

of equipment. This, in itself, complicates the selection process immensely. In order to narrow the choices and gain an understanding of the current equipment market, two steps should be followed in the process of system selection. These are, first, a competitive evaluation and then a financial evaluation. Either of these evaluations could be accomplished exclusive of the other and provide acceptable results. However, the combination of the two provides for a more extensive input and a broader base upon which a final selection decision can be made.

First, attention will be given to the method of competitive evaluation. In most competitive evaluation schemes, there are generally three stages.¹³

1. Determining decision criteria
2. Establishing relative importance of these criteria
3. Rating each vendor on how well he fulfills these criteria.

In the case of AMAS, the decision criteria were established on the basis of the various services to be offered. Many different groups of criteria could be established. For example, in the AMAS the following sets of criteria could be established.

General Criteria	25
Service Center Criteria	15
Physician Office Criteria	10
Application Availability Criteria	25
System Support Criteria	25

Under each of these general headings, various quality adjectives could be listed to further define the basis of evaluation. For example, in

¹³Jerome Kanter, Management Guide to Computer System Selection and Use, (New Jersey: Prentice-Hall, Inc., 1970), p. 145.

the case of the Physician Office Criteria Set, a subset of essential qualities and a subset of desirable qualities could be established, resulting in a complete descriptive chart of criteria attributes and qualities. A possible resulting chart is presented in Figure 14.

CATEGORY	CRITERIA	VALUE	VENDOR A		VENDOR B	
			Score	Weight	Score	Weight
Physician Office Equipment	Essential-----					
	Cost less than \$200	---	X	--	X	--
	Input/Output Availabil- ity	---	X	--	X	--
	Desirable-----					
	Computability	2	8	16	10	20
	Reliability	2	10	20	10	20
	Availability	1	10	10	10	20
	Common Data Link	1	10	10	9	9
	Ease of Use	1	10	10	8	8
	Service Availability	1	8	8	10	10
	Training Availability	---	5	5	6	6
	Ease of Installation	2	10	<u>20</u>	10	<u>20</u>
	SUBTOTAL:			<u>99</u>		<u>103</u>

Fig. 14.--Sample Decision Criteria Chart¹⁴

The importance of decision criteria is indicated by the value given to that category. In the case of Physician Office Equipment Set, a value of 10 is given. Each category would be given a value which would equal the sum of the sub criteria assigned values. Assigned values are based upon the judgment of importance in the AMAS. The AMAS values would probably be as indicated in the criteria set for AMAS.

The final step in the competitive evaluation of the AMAS would be in the rating of the selected vendors. Any number of vendors could be evaluated using a chart similar to that shown in Figure 14. It must

¹⁴Ibid., p. 147. Figure 14 is modeled after Kanter's Figure 5.5.

be understood that in order to complete the study, the derivation of data required to accomplish an objective rating of the vendors under the established criteria, would require using one or more of the following four techniques.¹⁵

1. Literature search
2. Vendor bid to system specifications
3. Application benchmark runs
4. Simulation

Once gathered, the data would be evaluated and rated on a scale of 1 to 10 and scored against the vendor. In the case of essential criteria, if the vendor does not meet one or more of these criteria, it is not considered any further in this criteria set. The resulting scoring would be multiplied by the criteria value assigned to give the vendor weighted score. When all categories are scored, the category sub-totals are added and the highest score (1,000 highest score) should point out the superior vendor. In the example shown in Figure 14, Vendor B appears superior in this criteria subset.

Attention should be given, not only to the grand total, but also to individual subtotals. The combination of various vendors may prove that the multivendor solution is the one to be pursued to provide the best results.

The second step in the system selection process is that of the financial evaluation. Once the competitive evaluation is completed, then each vendor or combination of vendors would be ranked by score, highest to lowest. Depending upon the number of vendors or combination of vendors considered, a selection of a top number would be made (3-5

¹⁵Ibid., p. 151.

vendors or combinations). Once done, then the following stages would be accomplished.

1. Development of Cost
2. Development of Dollar Benefits
3. Analysis of Return on the Investment Made

In establishing the cost, each area of the AMAS would be considered. Such items as the following would be considered: (1) Hardware Cost, (2) Programming Cost, (3) Startup Cost, (4) Maintenance, and (5) Specialized Support. Once that each of the vendors or combination of vendors had been evaluated, with regard to these and other cost areas, then these would be contrasted with each other to derive a benefit in terms of dollars back to AMAS. The resulting data from the contrasting would be interpreted as the dollar benefit data. The objective here is to count the dollar benefit that may be present in a system offered by a particular vendor or combination of vendors, that would appear in total as being more costly than other vendors. In essence, this is only a guess at the increase profit margin by use of this equipment at the service user level. However, if this is consistently applied, the results will be valid in terms of an overall financial evaluation.

The final stage in this step of the system selection process is the evaluation of the return on the investment made in the selected vendor. It must be pointed out that this is a very simplified and subjective evaluation. This is so, due to the necessity of estimation of numerous values that are input to the formula. None-the-less, this evaluation step will aid significantly in the overall evaluation process and may reveal a financial consideration that is not readily visible from a limited examination of the vendor.

To demonstrate how this evaluation would work, Figure 15 is offered in an attempt at simplification of the return on investment input and calculation procedure.

This procedure is applied to all the vendors and then matched with the competitive evaluation results. From these two sets of data, the final selection of system is made. In using the two step approach, a very good second choice in the competitive evaluation step may prove to be the best choice, after consideration of the financial evaluation.

As can be seen from the discussion of system selection, this process could prove to be quite complicated and time consuming. It is for this reason that actual data was not used here, but merely a discussion of the approach that would be used in the selection of the system for AMAS.

Summary

As indicated at the outset of this discussion, the objective of the system design and construction is to provide a flexible adaptable system. In the process of evolving this sort of system, consideration was given to the market and a general definition of the market consideration was established. The bearing that technology has on system design was considered in the development of the system technical definition, which culminated in a general definition of the system idea and concept of operation. In building the system, extensive detail was given to clearly define each of the five service modules. The objective is to develop each system service in the module concept, demonstrating its flexibility of service as well as its independency of the whole. This being the central element in the AMAS. Too great attention of detail

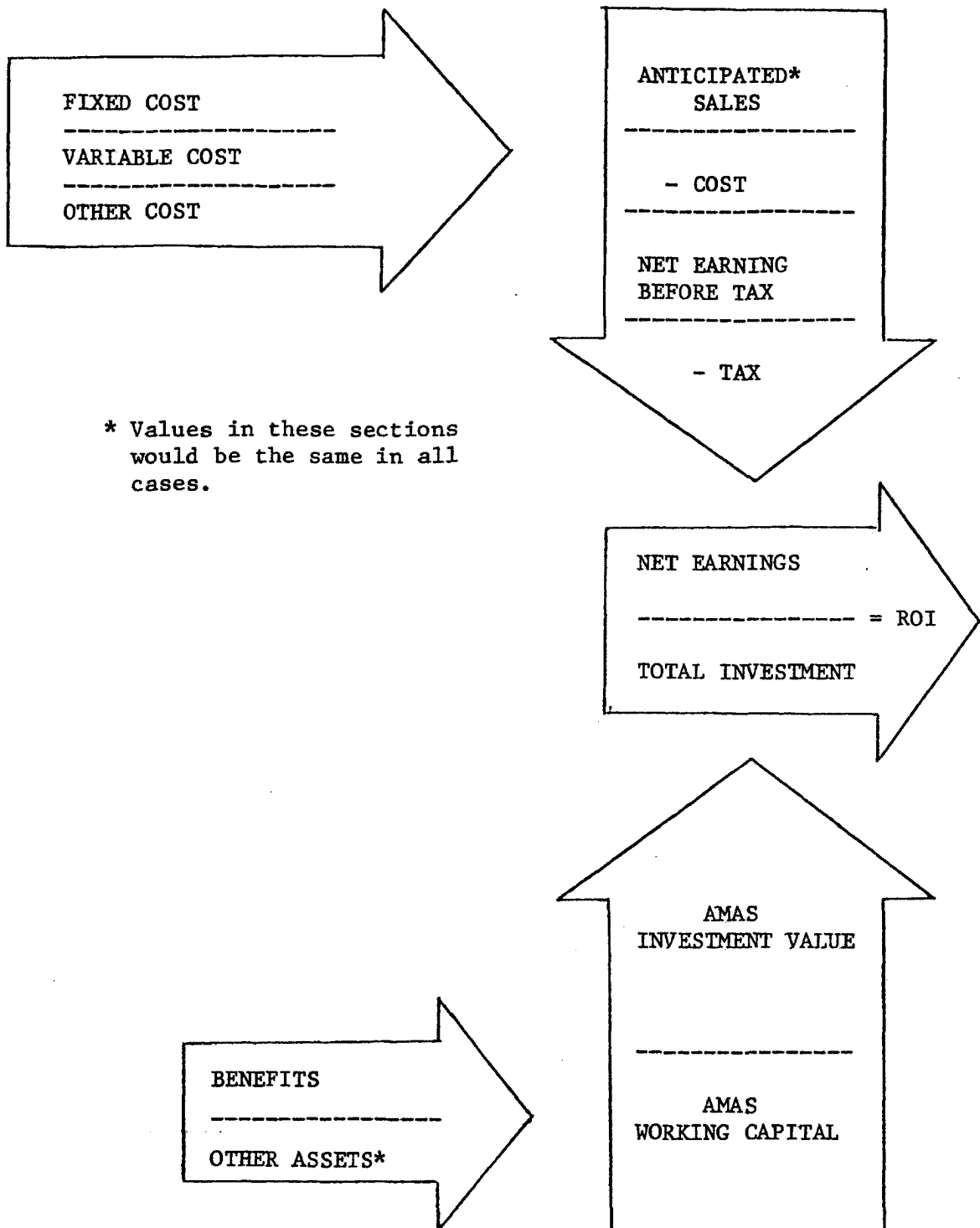


Fig. 15.--Evaluation of Return on Investment (ROI).¹⁶

¹⁶Ibid., p. 168. Figure 15 is modeled after Kanter's Figure 5.16.

could not be given. Once completed, the system was then reviewed for equipment requirements and capability and, the market tested for availability of that type of equipment. The area of program development was considered with respect to three classes of programs: supervisory, operational and director. Finally, a two step method and discussion was accomplished, with regard to system vendor selection.

Now that the AMAS system has been established, described and discussed in some detail, it is time to turn attention toward the organizational and managerial aspects of AMAS.

CHAPTER IV

MANAGEMENT OF THE AMAS ORGANIZATIONAL ENTITY

In dealing with the AMAS (Automated Medical Administrative Services) in terms of the management of the organizational entity, the five principles of management; planning, organizing, staffing, directing and control, are considered. Evidence given by the Missouri Division of Mental Health¹ case history of the development of shared automated system among independent medical institutions concluded that consideration of these areas is of extreme importance in the ultimate success or failure of this type of system.

Planning

The first consideration, with regard to AMAS planning is the establishment of service philosophy. This is of primary importance, for all planning must be in accordance with the philosophy of operation.

As indicated earlier, an objective of system design was flexibility. This, too, is an objective of service delivery. Flexibility, tied together with complete, accurate and timely service, will be the underlying theme of AMAS service philosophy.

The role of creativity is of extreme importance in all phases of

¹A. P. Ameiss, R. J. Brewer, H. E. Wood and W. A. Thompson, "How to Organize for Shared Systems," Journal of Systems Management, December 1970, p. 33.

planning. It is through the use of innovative ideas and approaches that the true service of AMAS is revealed. Creativity in planning will be indicated by the proper provision of time and resource to allow for maximization of the service offered.

A final consideration in the overall philosophical approach will be in the growth objectives of AMAS. Central in this aspect is the idea of community base operation with movement to local outlying areas. Anticipated growth should not be restricted to the basic service, as presented thus far. It should include movement into the collateral medical specialties, such as dentistry and optometry. Consideration should be made to the potential for branch data collection and processing stations for long distance operation possibilities. Continual modification and service package development and improvement should also be a factor included in the AMAS growth outlook.

Now that a general feeling for AMAS service philosophy has been established, attention will be turned to the planning activities leading the implementation of the AMAS system described in the last chapter. In developing a new business such as AMAS, it is very difficult to envision the movement through time and the associated steps getting one to the first day of operations. As a method of planning, the PERT type system² provides a visible guide that can be effectively used in the various stages of planning leading to the implementation of the AMAS system. This sort of planning procedure has been applied to other automated medical service activities. An example of network application in

²The PERT type system considered here is like that considered by, Frederic G. Withington, The Use of Computers in Business Organizations, (Reading, Massachusetts: Addison-Wesley Publishing Co., 1971), p. 71.

planning is demonstrated by PRIME³ (Primate Information Management Experiment). In this method, the study group outlined the planning of the system through a series of phases. Using this idea, the AMAS system planning would consist of the following phases of activity.

- I Study Phase
- II Selection Phase
- III Preparation Phase
- IV Implementation Phase
- V Operational Phase

To demonstrate how this system would work, the following series of diagrams illustrate the PERT network style system that will be used in the planning of AMAS. The objective of the use of the PERT system is not only to provide a construct, but also to allow for a mechanism that would reveal the overall effect of a problem in any area of the entire AMAS plan. In constructing the AMAS PERT Networks in Figures 16 through 18, only general steps are included. A more detailed approach would be accomplished after completion of a phase and prior to movement into the succeeding phases and as actual experience is gained. Provided here is the general framework for all AMAS planning.

In using this five phase approach to planning, all the principles of planning are incorporated. An overall goal structure is established and time sequencing is present to allow for adequate evaluation of progress. Each phase requires the coordination of long and short term requirements. At any point in the process, additional and refining steps

³L. B. Lusted and R. W. Coffin, "PRIME: An Operational Model for a Hospital Automated Information System," Proceedings of the IEEE, November 1969, p. 1961.

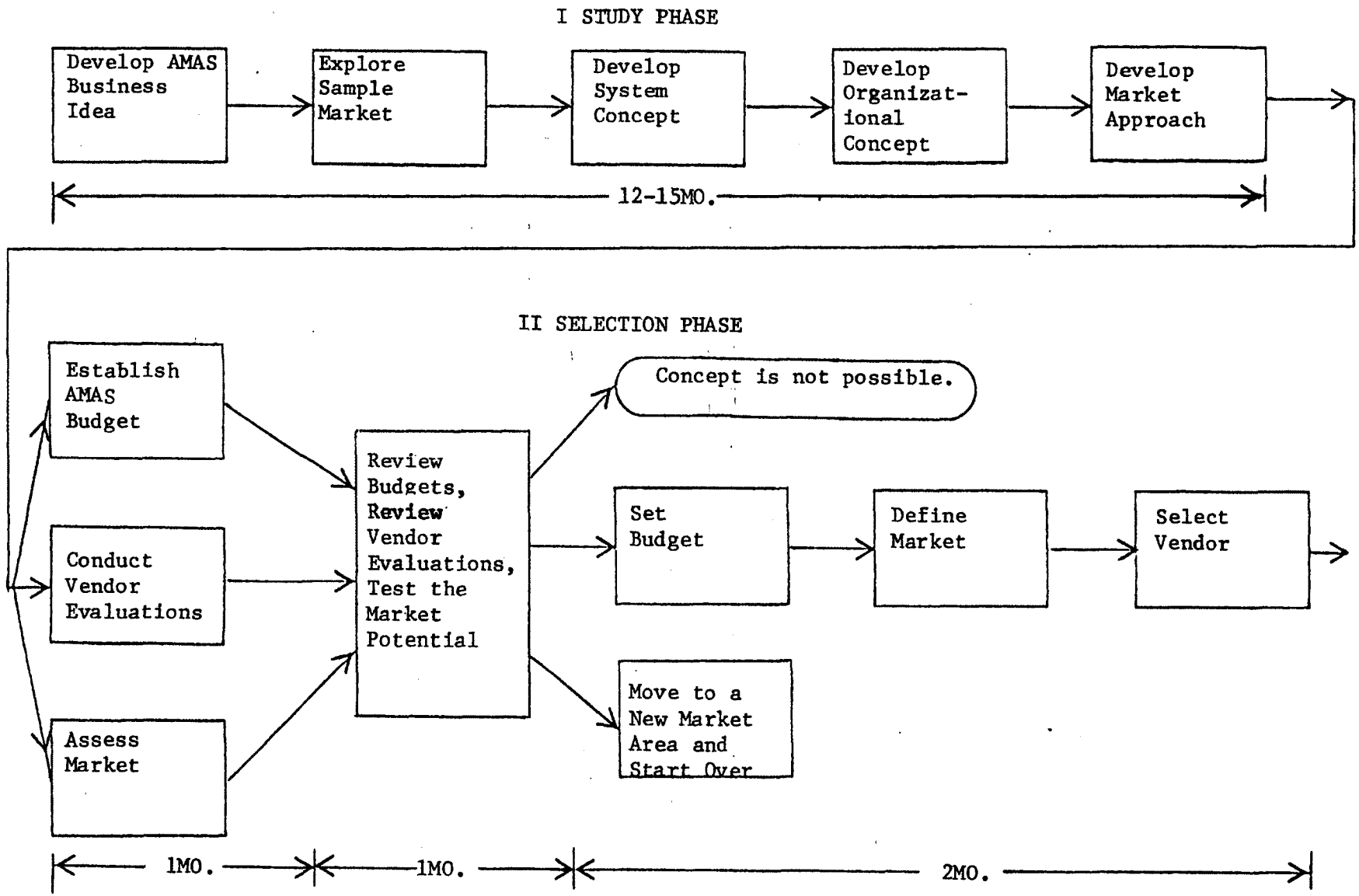


Fig. 16.--AMAS PERT Network. I. Study Phase. II. Selection Phase.

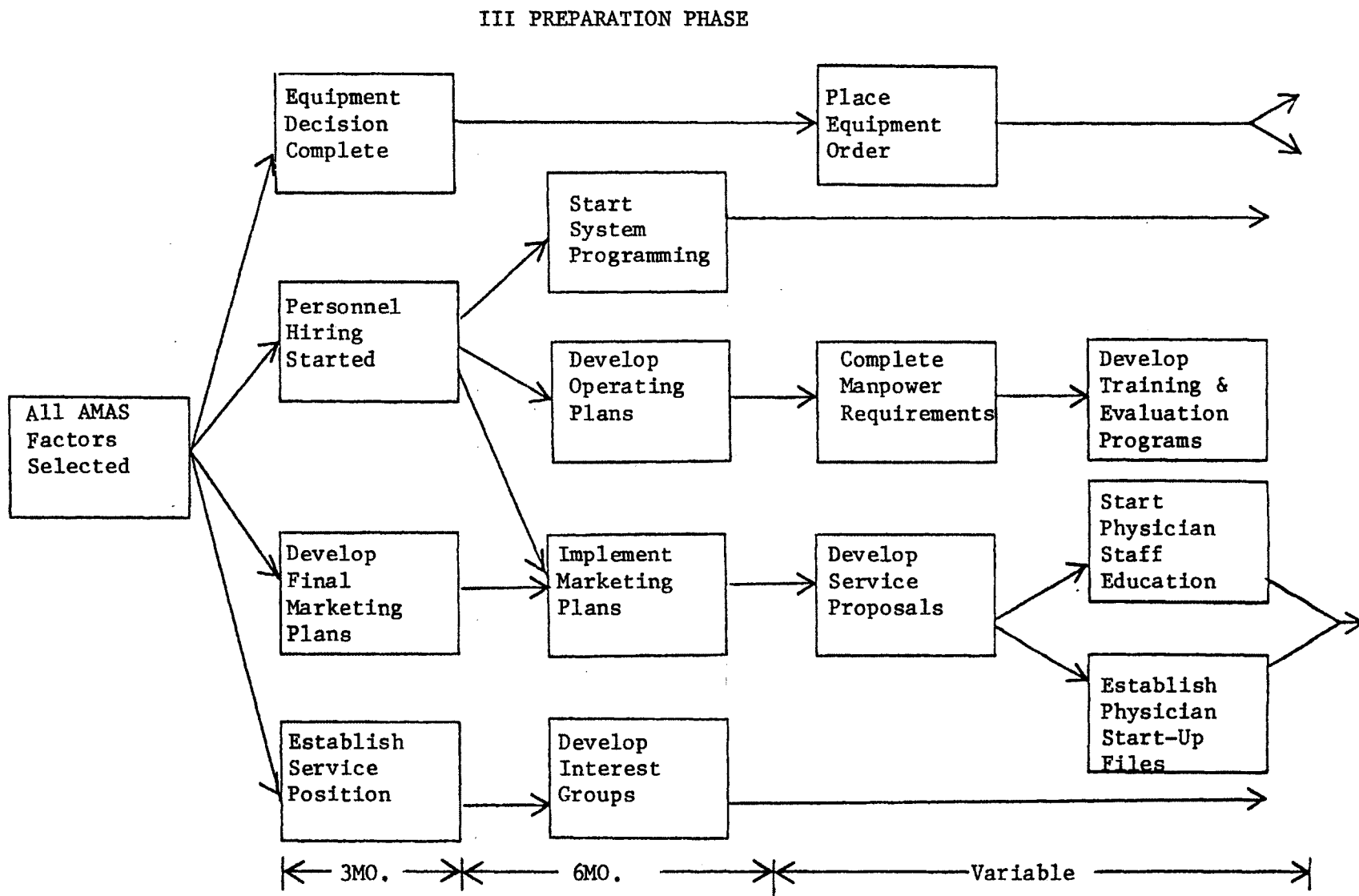


Fig. 17.--AMAS PERT Network. III. Preparation Phase.

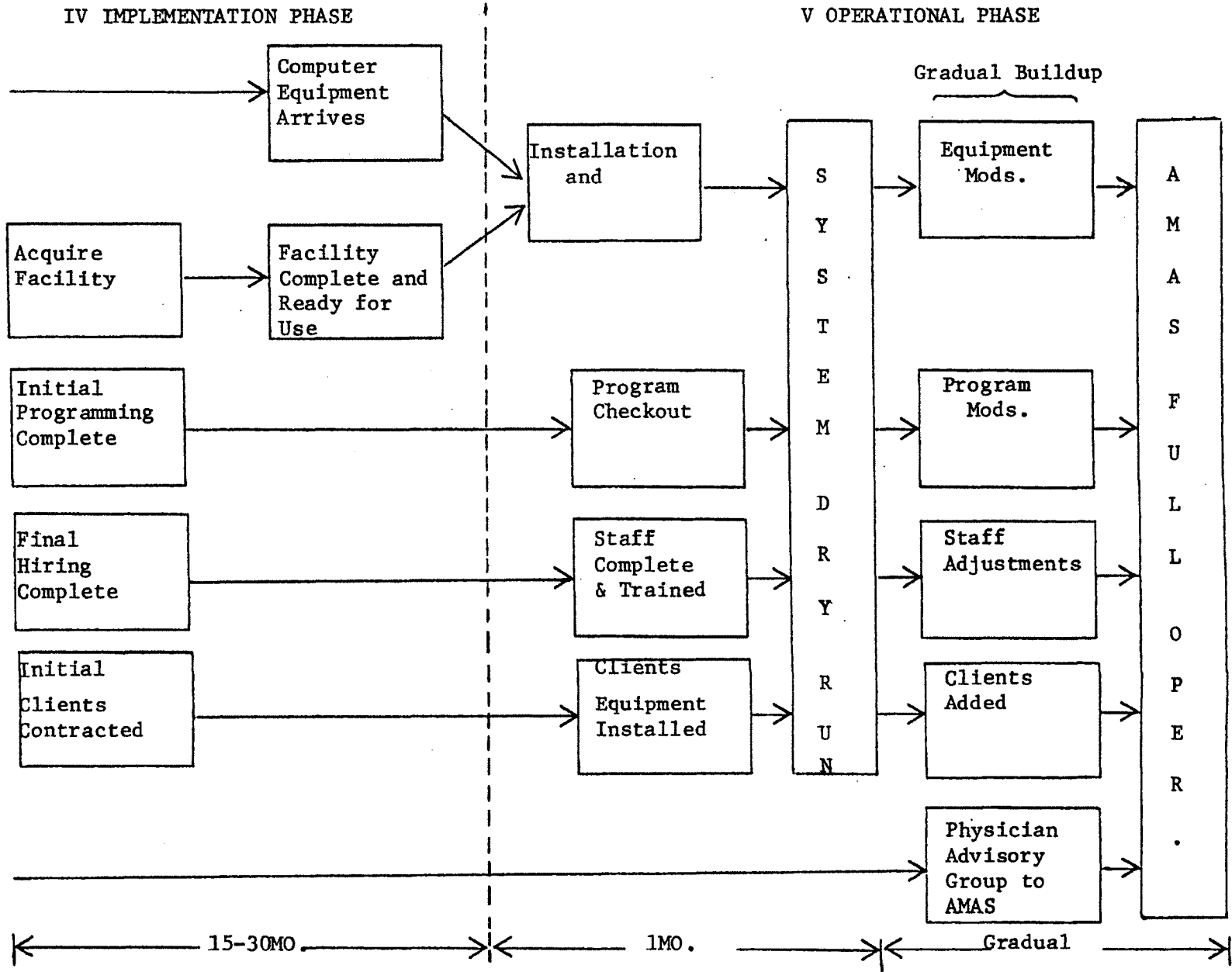


Fig. 18.--AMAS PERT Network. IV. Implementation Phase. V. Operational Phase.

can be incorporated to achieve the best results. As can be seen in all of the later three phases of planning, the area of organizational development, market development and system development, are time phased so as to have these three critical elements available at the moment that equipment costs are incurred. Also important to note is the early development of physician file data build-up to prevent lag in service upon final equipment installation. The early development of physician interest groups is provided to accommodate the early medical expertise required in the development of acceptable practices. These and many other constraints can be programmed into the PERT type Network to provide a complete picture of the planning problem.

Planning in the AMAS operation is continuous. Each area of interest or service offered will be accompanied by a continuation plan. These plans will require time phased evaluation of all types. Overall AMAS continuation planning will deal with the growth objective of AMAS and service upgrade and improvement.

Organizing

Now that the overall AMAS planning approach has been discussed, the question of plan implementation must be considered. In an effort as extensive as AMAS, the one man operation is definitely out of the question. Therefore, the need to develop a structure to carry out plans and objectives is absolutely necessary. In dealing with the AMAS organizational structure, a task oriented organizational chart will be developed, internal work flow will be discussed and organizational support activities will be reviewed.

In constructing the AMAS organizational structure, attention

will be given to the basic service module activity as well as the general categories of organizational functions. Each level of organization in the AMAS structure will be a working level. Figure 19 depicts the proposed structure of AMAS. As can be seen, even the head man will be a worker in the organization. The president of AMAS will also be the general manager. The only vice-president in the firm will be the vice-president for finance. This level is assigned to finance due to the fact that AMAS will be a fledgling company and close attention will be required with regard to the company finances. The physician advisory group will be composed of subscriber physicians and will serve as a review panel for proposed changes in service design and output. It will have no functional authority in the AMAS organization. The remainder of the structure will consist of three major areas of activity: Operations, System Development and Sales. A staff accountant will be present to review products and quality control reports. He may also serve as the subscriber physicians' accountant if the subscriber so desires or may be the physicians' accountant contact with AMAS.

The operations manager will be responsible for the daily operation of the service. He will be the direct supervisor for all operations employees. He will be responsible for the development and evaluation of work routines and procedures. He will be evaluated on his ability to meet service goals and product quality standards while accomplishing the operations task within the budget constraints provided.

The system development manager is responsible for computer program development and maintenance, the establishment of training for personnel in system procedure, and quality control of product services. He will be the direct supervisor of all programmers, analysts and

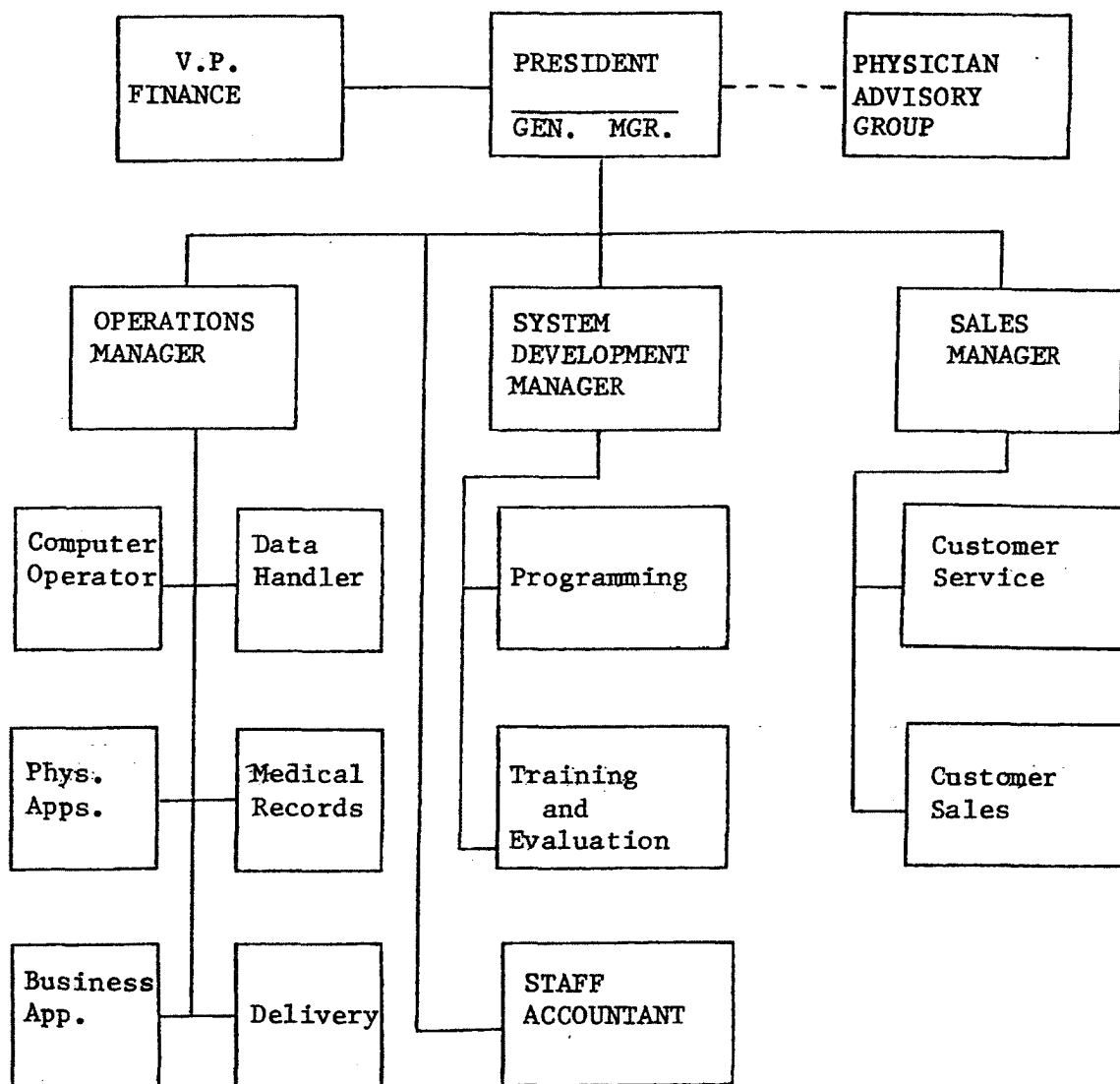


Fig. 19.--AMAS Proposed Organizational Chart.

training/evaluation personnel. He will be evaluated on his innovation and creativity as well as his ability to develop low cost highly effective service systems.

The sales manager will be responsible for the overall AMAS sales program. This will include the development of pricing, promotion and training of customers of the AMAS product. He will be the direct supervisor of all sales and customer service personnel. His area of responsibility will include such things as a customer visitation program, seminar development and market education. Evaluation of this manager will be based upon quality questionnaire responses and customer visitation reports as well as sales growth goals and budget control.

The internal work flow of AMAS will require the full participation of all managers and employees. Each individual is expected to be productive with respect to the work that is required to produce the final product. As the system matures, the organizational structure will be reviewed with respect to work activities and adjusted where cross functional activity appears as well as for the reduction of activity burden.

In order to effect the best possible man-machine blend, the organizational structure will be adjusted to match work flow and provide the blend desired. Consideration of department and functional area re-organization will be made if the man-machine blend appears to be affecting the final AMAS product that is output to the subscriber.

Staffing

It must be understood that the development of AMAS will be through the establishment of an interest group. Therefore, the discussion to

follow deals with the final non-manager hiring and replacement hiring for managerial personnel. The reason this is pointed out is that it is highly probable that a number of three management positions, if not all, will be filled by members of the interest group.

The AMAS overall employment policy can be summarized as follows: (AMAS is an equal opportunity employer, looking for energetic, innovative and creative people. Each employment opportunity will carry with it a specific set of educational and experience requirements. Each customer oriented job will additionally require specific types of people.) This overall policy is applicable to all AMAS positions, whether they are a major management position or an AMAS delivery person.

The staff requirements for AMAS will vary with the stages of development of the business. For example, in the selection phase of AMAS development, the only staff will be the interest group of probably no more than two or three people. As AMAS moves into the preparation phase, then the five top management positions will have to be established. As AMAS moves through the preparation phase, additional employees will be acquired as the work load increases. These individuals will be core or nucleus employees that will assist in supervision of AMAS startup. By the time of implementation phase, all the hiring that will be needed to become operational will be completed.

As AMAS becomes completely operational, manpower will be allocated in accordance with Table 9. To insure that staff is properly manned and that additional manpower requirements are met, a resource pool will be kept current and updated as new job applicants apply for a position with AMAS. Then, when the need is discovered, the replacement of personnel will not be a time consuming or difficult process

TABLE 9

AMAS MANPOWER ALLOCATIONS

AREA	AMT.	QUALIFICATIONS
Top Managers	2	Extensive management training and experience.
Operations Manager	1	Training in management and EDP, experience is required. Degree desired.
Comp. Operator	2	Training and experience in EDP req. Basic Ed.
Data Handler	2	Training and experience in EDP req. Basic Ed.
Phys. Apps.	2*	Experienced app. clerk, typists. EDP desired. (BE)
Medical Rcrds.	1	Experienced medical sec./transcriptionists. (BE)
Business App.	2*	Experienced EDP operators/clerks. Basic Ed.
Delivery	1	Drivers license. Experienced driver desired.
Manager System Development	1	Training in management and EDP. Experienced programmer or analyst. Degree desired.
Programmer	1	Experienced programmer or analyst. Degree or basic education depending on experience. Must be able to program multiple languages.
Training & Evaluation	1	Experience in EDP and teaching. Able to develop training programs. Programming desirable. Degree desired.
Sales Manager	1	Training in management with strong sales background. Experience. Knowledge of EDP. Degree or (BE)
Customer Service	1	Strong general EDP knowledge in operations. Teaching and sales desirable. Basic Ed.
Customer Sales	1#	Very strong sales background and experience. Knowledge of EDP required. Basic Ed.
Staff Accountant	1!	CPA or comp rable experienced PA.

* One part time employee, same requirements.

Commission sales personnel not counted, same requirements.

! Accountant serves on retainer.

with regard to personnel search. In addition, AMAS will invite qualified personnel to submit applications and data for inclusion in the resource pool even if a position is not currently open.

Selection of personnel to be included in the pool will be accomplished like any AMAS hiring. Applications will be taken, general questionnaire will be compiled and analyzed by a service, job proficiency exams will be given, and interviews with the general manager and department manager will be accomplished.

As mentioned earlier, it will be the system development manager's responsibility to develop and maintain training programs. As each new employee joins AMAS, he will be placed in a training program that will prepare him for his functional duties. This program will be developed by the system development branch in cooperation with department managers. In order to maintain the highest quality training, these programs will be updated frequently and modified as new employees complete training and as new developments are introduced.

The only special or auxiliary staff requirement that AMAS will initially require will be in the area of legal assistance. The hiring of a full time council would be a waste of money in the initial periods of general operations. In order to provide for this service, AMAS will select a lawyer and then place him on a vested interest retainer in the firm. That is to say as goes the firm so goes his fee. It is felt that sound legal counsel will be of vital importance to AMAS and to insure that it is obtained, this method appears to be the most effective, especially in the early operations period.

Directing

The function of directing involves numerous elements, including leadership, communication and motivation. In the discussion of this function in AMAS, general consideration will be given to each of these elements.

The primary leadership roles in AMAS will be the general and department manager. In assuming these roles, each will have two basic leadership objectives. The first of these is to provide a buffer between AMAS staff and AMAS subscribers. The purpose for this is to establish the organizational structure and line of authority within AMAS. Simply put, the client is not the staff's boss, the AMAS managers are their bosses. The second of these objectives is the development of a good man-machine blend. Essentially, what is implied by this, is that too often in a computer service business, the managers tend to forget the people for the equipment. The objective here is to put each in their proper perspective and provide the human interaction with staff that is necessary for a successful and happy enterprise.

AMAS is in the information communication business and the element of intrabusiness communication is vitally important for successful accomplishment of these information communications.

This is the reason why the AMAS job process system will provide a detailed job order sheet that will be initiated by the operations department data handlers. This sheet will be used by all personnel involved in the completion of any given job. In essence, this is a written order given by management. The real value of this system is that, at each action point, the individual annotates the job order and

passes it with any job materials to the next individual in the job process. In passing the order, a communication has been developed. Further, review of job orders by management establishes a form of vertical communications that is valuable in the control of activity.

Standard Operating Procedures (SOP) will be an important document in all activities of AMAS. It is through this form of communication that AMAS general methodology, objectives, and desired results can be best presented. Further, the SOP will provide a standardization of action, therefore, uniformity of service product.

These two methods of communications combined with personal communication between manager and employee should be more than adequate in satisfying the communications element of the director function or interior input as is shown in Figure 2.

The element of motivation is a much more difficult element to deal with than leadership or communications. The AMAS objective in this area will be to establish a team feeling among all concerned. This can be accomplished by insuring that all employees are kept informed of goals and the progress, by individual contribution, toward these goals. Additionally, pay benefits such as medical care, retirement programs and vacation time can be used to promote a feeling of belonging and, thus, a responsibility to expend maximum effort.

Above all, genuine honesty and mutual trust are the key elements in successful directing. These, tied with the general ideas discussed here, should be more than adequate in the area of directing.

Controlling

The final principle of management to be discussed is the principle of control. As pointed out by Koontz and O'Donnell,⁴ the control process consists of three basic steps.

1. Establishment of Standards
2. Performance Measurement
3. Adjustment for Deviations

In establishing the control functions of the AMAS management approach, attention will be given to these three areas.

In establishment of standards, both services offered and internal operations will be considered. Due to the character of AMAS service orientation, standards stated in quantitative terms will be seldom developed. Instead, quality in terms of satisfaction of output and assistance will be considered. In essence, the standards of service will be expressed as the level of subscriber satisfaction. This satisfaction will be determined on the basis of customer's expression of service output usefulness and customer's estimation of service action helpfulness in achieving individual practice goals.

From the standpoint of internal operations, a more numerical or quantitative approach to standards can be taken. For each specific job-service offered, a job study will be developed. This study will provide basic outlines and goals of the job as well as a chronology of service. Initial standards will be general and relatively easy to meet,

⁴Harold Koontz and Cyril O'Donnell, Principles of Management, (New York: McGraw-Hill Book Co., 1968), p. 640.

but as the job is reaccomplished and documented, the data base for analysis will be available to establish more refined and specific standards. The Standard Operating Procedure (SOP) discussed in the section on directing will also be used as a tool for standards establishment in internal operations. The SOP for each job will list general operations standards in numerical terms as well as quality descriptions of product outputs.

The measurement of performance, with respect to AMAS standards will again involve both exterior and interior aspects of AMAS. In measuring compliance with service standards, two basic techniques will be employed. First will be the customer quality questionnaire. This questionnaire will be distributed as various phase points to all AMAS clients. The objective of the survey will be to establish a quality estimate and point out specific problem areas in all facets of the AMAS service. A second service measurement device will be the visitation program developed by the sales department. In this program, AMAS clients will be visited by customer service personnel. In the visit, specific areas will be discussed and the results of the discussion will be submitted in the form of a visitation report.

Internal operations measurements will be accomplished through the use of the job order sheet and employee evaluation techniques. As discussed earlier, the job order sheet will accompany all jobs as they move through processing. In addition to instructional information, the job order sheet will also include measurement and performance data documentation. Such items as time expenditure, error routines, faulty set-ups and materials used will be documented by each person involved in the job process system. Employee evaluations of internal operations will be

conducted by each AMAS major manager. These evaluations will be conducted in conjunction with operation plan reviews and period SOP rewrites. The objective in this measurement device is to obtain worker evaluation of standards and develop a feel for future problems in AMAS operations.

In using these two measurement devices, the view of internal standard attainment will be set in both present and future basis. Further, a continual refinement of operations will be able to be accomplished on the basis of measured performance and established experience.

The final principle of control, adjustment for deviation, follows directly if standard setting and measurement are complete and correct. The objective of AMAS in this principle will be to adjust the situation in a prompt and complete manner. This will be possible in that the analysis of measurement will be assisted by the application computer programming developed or purchased. AMAS mark-sense equipment will read quality questionnaires and job order forms directly into a pool of data to be automatically analyzed by the AMAS Executive/Management programs. The ability to update the measurement file and readjust analysis without expensive time loss to AMAS personnel will allow for prompt correction of discovered deviations in both service and internal operations areas. Continued evaluation of discovered deviation will be accomplished to aid in detecting long range deviations or deficiencies.

In general, the AMAS control function will be conducted on a basis of line objective. This function will be real time, objective, flexible and economical with respect to management development and attention. The ultimate objective is to point out deviations, suggest remedy and effect solutions to the problem.

Summary

In the management of the AMAS organizational entity, the five principles of management will be the basis of management technique application. In reviewing the AMAS planning approach, presentation of the five phase PERT style plan was accomplished. AMAS organization was presented through the development of the AMAS organization chart, development of major position descriptions and internal work flow. AMAS staffing requirements were outlined and the ideas of resource pooling, selection of personnel and establishment of training were examined. The question of special or auxiliary staff requirements was also considered. In reviewing the AMAS approach to directing, the ideas of leadership, communication and motivation were considered. The final management principle of controlling was discussed with respect to standards, measurement, and adjustment.

Thus far, the system and management structure of AMAS have been developed. The final area to consider in the development of AMAS is the AMAS marketing approach.

CHAPTER V

AMAS MARKETING APPROACH

AMAS Marketing Problem

The most difficult aspect of the AMAS marketing approach is the development of the product construct. As Stanton¹ points out, services are intangible and, therefore, the purchaser cannot physically sense a service prior to its purchase. This attribute places somewhat of a strain on the organization of the marketing approach and, hence, results in marketing programs that are often different from those used in marketing tangible products.

Therefore, in developing the product construct, value gained from purchase of the AMAS service will be expressed in terms of the benefits derived. In essence, then, the product is the set of benefits derived from the purchase of the service. From the AMAS point of view, the product is the service that provides the opportunity of the benefit. In dealing with this seemingly paradoxical situation, the market approach must be a settling factor that provides a happy medium between the two understandings of the product. Since the objective of AMAS is to sell the service, then the product development and approach must be in terms of the derived set of benefits. Therefore, before discussing the AMAS

¹William J. Stanton, Fundamentals of Marketing, (New York: McGraw-Hill, Inc., 1975), p. 550.

marketing approach any further, a statement of the benefit system and the delineation of the specific benefits is in order.

The overall approach that will be taken, with regard to the benefit system, is the contrast of the physician's current mode of operations with that which can be provided by the AMAS system. This type of a concept can be best presented graphically. Figure 20 depicts the activity network of a physician's practice without the use of AMAS and a practice that used the AMAS service. The objective in the graphical comparison is to dramatize the unorderliness of the physician's practice that does not use the AMAS product. Further, the idea of a "common data base reports generator" is also developed by showing the various types of data (i.e., accounting data, medical words and billing data) going, in raw form, directly to AMAS. The results of the common data base provided by the physician is an envelope of services which are in final form. This envelope consists of appointment schedules, medical records, practice analysis reports, accounting reports and payments received from patients or third party institutions for medical services rendered. The flow of data is direct and uncomplicated whereas, in the non-subscriber practice, the physician must maintain numerous separate data bases, provide redundant and cross communications as well as maintain the staff and administrative support programs to accomplish the task.

Now that the product benefit system has been developed, attention will be given to the determination of the benefit set. Specifically, the AMAS subscriber benefits will be as follows:

Simplicity: Little experience required to operate AMAS system; current employees trained at no extra cost.

PHYSICIAN PRACTICE WITHOUT AMAS

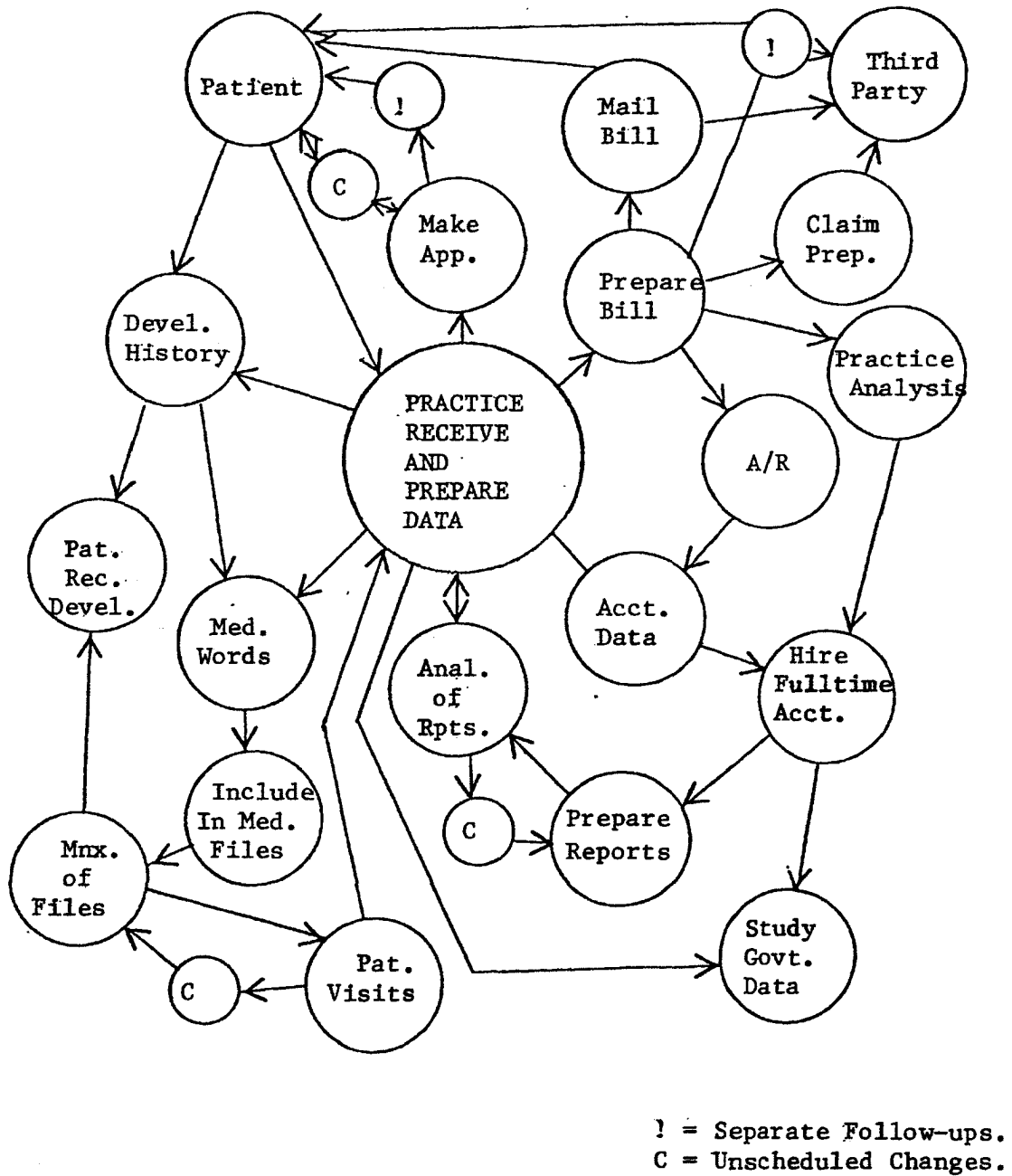


Fig. 20.--Physician Current Practice Compared with AMAS Work Flow.

PHYSICIAN PRACTICE USING AMAS

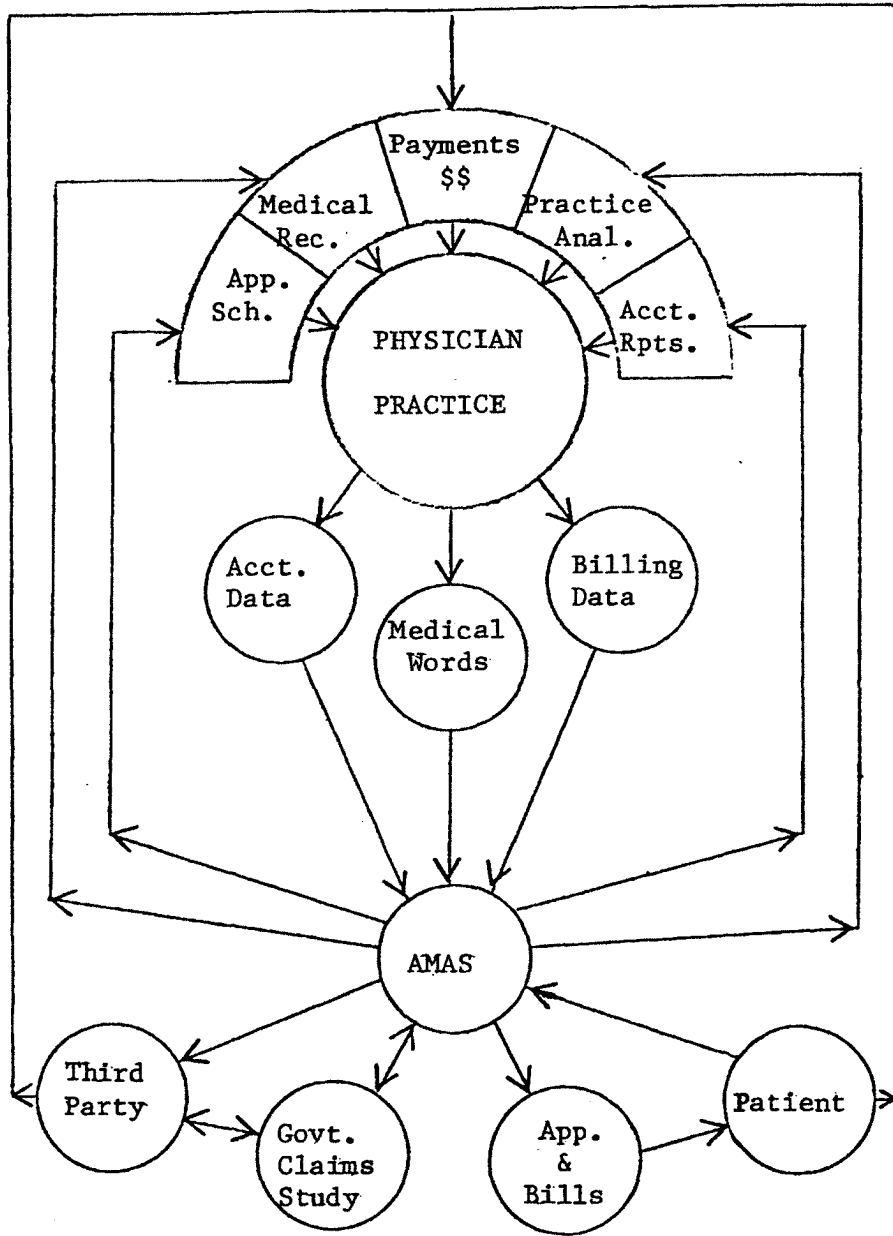


Fig. 20.--Continued

Speed: Input is as fast as you can key the data into the system; bill mailed within 8 to 24 hours, depending on input option.

Confidential: All medical data is entered under patient codes assigned by physician and staff; the only listing of these identifying codes is kept by physician in his own office.

Use Existing Procedures: Service is tailored to fit existing practice procedures.

Audit Trails: All data is followed through and cross referenced.

Control: The physician has full control of his system service with AMAS.

Accuracy: Personnel that are currently employed by physician accomplish data entry.

Errors: Both prevention and correction procedures are employed.

Low Cost Data Entry: All data entry devices are provided by AMAS at AMAS prices with AMAS service.

No Capital Investment: No equipment repairs, replacement planning, or equipment updates required.

Flexibility: Any of five service modules, providing over two dozen functions are available to every subscriber.

Profitable: Decrease in employee salary and/or increase in time available to provide medical services.

Professional Consultation: Professional managers, computer analyst and administrative specialist design the system and are available to assist in the individual practice problems and AMAS applications.

The benefit system is defined and the associated benefit set has been identified. In essence, the product construct is complete and the marketing problem becomes clear. That is, to build the approach

that AMAS will use in the planning, pricing, promoting and distribution of the AMAS service to initial and future physicians.

The solution approach that will be used in defining the AMAS marketing approach will be to discuss AMAS marketing with respect to four different areas. The areas to be discussed will be the service as a product, the service pricing decision, the promotion plan and service availability and access. In viewing each of these areas, general approaches and ideas will be presented to indicate the AMAS marketing approach. As Stanton points out in marketing of services, "The burden falls mainly on a company's promotional program, where the salesmen and advertising must concentrate on the benefits to be derived from the service."² Therefore, a more concentrated effort will be made in the discussion of the AMAS promotional plans.

Service as a Product

In discussing the AMAS marketing approach with respect to the service as a product (service), the establishment of AMAS service line and mix, quality and the product in time will be considered. The first to be discussed will be line and mix ideas.

As designed, the AMAS system has already provided a framework for the product line. The idea of the five modules of service activity is essentially a line of service offered by AMAS. They all have a similar use and are all the same in concept and, thereby, fit the line idea. The AMAS service line, therefore, consists of:

Appointment Service

²Ibid.

Accounting Service

Billing System Service

Medical Records Service

Management Analysis Service

If the breadth³ of the service mix is defined by the line of services offered, then the depth of the AMAS product mix could be described by the assortment of outputs that are produced. Therefore, the AMAS service mix could be defined as the five services previously listed consisting of the following outputs.

1. Appointments Register
 - a. Document Form
 - b. CRT Display
2. Patient Medical Records
 - a. Medical History
 - 1) Document Form
 - 2) CRT Display
 - b. Treatment Records
 - 1) Document Form
 - 2) CRT Display
 - c. Other Records (Tailored)
3. Billing Data Outputs
 - a. Bills to patients
 - b. Bills to Third Parties
 - c. Institution Health Claims

³Ibid., p. 192. Breadth and depth of product mix as defined by Stanton.

- d. Accounts Receivable Reports*
 - 1) Aged
 - 2) Status by Guarantor
 - 3) Forecast Reports
- e. Invoice Registers*
- 4. Practice Analysis Reports*
 - a. Physician Activity by Diagnosis
 - b. Physician Activity by Procedure
 - c. Physician Activity by Other Indices
- 5. Accounting Reports*
 - a. Financial Statements
 - 1) Balance Sheet
 - 2) Income Statement
 - 3) Funds Flow
 - b. Account Ledgers
 - c. General Journal
 - d. Payroll
 - 1) Summaries
 - 2) Employment and Compensation Records
 - 3) Check Writing

*CRT display not normally available for these outputs; however, if desired, CRT display could be provided.

As can be seen, the AMAS service is rather extensive and reasonably inclusive. A sixth service line could be included in this discussion. However, to this point, no mention has been made of a sixth service. This sixth service is that of specialized or tailored services. The idea of this service is projecting the availability of purchasing computer time for research or other physician unique activity.

The AMAS service does not simply include the output of a piece of paper at the other end of the magic box. The quality of service includes numerous attributes. It includes everything from the first meeting of physician and AMAS sales representative to the telephone conversation between physician and AMAS staff. The overall attitude of "We Aim to Please," must be present at every interaction. In view of this philosophy, the importance to make every effort to mold the AMAS system to the needs of its clients is central in the overall product idea.

Therefore, the service as a product is more than paper. It is complete and total responsiveness to the needs of the AMAS subscriber. In order to be responsive, the AMAS people must always be reviewing the service and keep an ever vigilant eye on the horizon. Every effort must be made to keep a current and competitive service. As new innovations are presented, the integration of these ideas must be considered, for this is a part of the AMAS service that will truly give subscribers a more complete set of service benefits.

Service Pricing Decision

Next to the AMAS promotional problem, the pricing of services will be the most difficult problem. The biggest problem in this regard is the fact that there are substitutes that could be used for comparison, but it is suspected that the AMAS concept is not very comparable due to the new approach. Therefore, in determining the initial price structure, it is felt that the cost basis for price determination should be used.

It would serve little purpose to develop a pricing schedule or other specific data with regard to AMAS pricing at this point. Any data gathered up to now is insufficient to develop any useful figures. In

order to arrive at a reasonably adequate view of demand, test marketing will have to be conducted. However, when measuring demand, consideration will have to be given to the units of measurement. There are several units of measurement that could be used. Among these are physician, service purchased and input option. Each of these would produce different results and may tend to confuse the problem. Perhaps the best way to measure would be in terms of each product line. Then an analysis of product line pricing could be accomplished. It would be a simple matter to then average or, in some way, adjust demand findings on individual services to obtain the overall demand estimate for the entire AMAS line.

Initial steps to price determination using the cost method could be accomplished for what ever area AMAS planned to establish without much difficulty. In determining cost, such items as startup cost, variable cost and fixed cost would have to be determined.

In dealing with startup cost, the question of purchase or rental of equipment comes immediately to mind. In dealing with this question, consideration of the current market will aid in the decision. If the market appears to be strong enough to support AMAS for five⁴ or more years, then the equipment will be purchased. Otherwise, a purchase option should be arranged. Other startup costs will include plant modification, initial file generation, telephone equipment installation, training of personnel and client development cost.

Variable cost will include salaries of personnel, purchase of supplies and communications cost. Each of these items will vary with the number of clients and types of services purchased.

⁴Withington, Use of Computers in Business Organizations, p. 39.

In the fixed cost category, rentals of all types, management salaries, service contracts and overhead can be found. It is in this area that the greatest return for dollar expended should be emphasized.

Using fixed and variable cost, plus a pro rated startup cost, based on normal depreciation, a total cost curve can be developed. It is at this point that the results of the market study are useful. Through whatever unit of measurement desired, the per unit of service price can be determined through the application of breakeven analysis. The results here would be the breakeven price of the service.

At this point, the determination of profit margin desired must be made. This is where other computer service performance data figures can be useful. Based upon this data, an average profit figure could be determined and applied to bring AMAS into line with its industry. A most important point here is to insure that the profit margin can be obtained from the market being served.

Once AMAS becomes completely operational, a re-evaluation of pricing should be conducted to determine if any adjustments in pricing are required. At this point, AMAS can develop sound policies on its discounts position for full line customers and other such price discount tactics. Once a firm data base has been established, then AMAS will be able to use pricing as an effective marketing tool.

The Promotion Plan

As mentioned earlier, the burden in marketing of services falls mainly on a company's promotional program. In view of this, effort will be made to explain the AMAS promotional objective, its promotional mix, and philosophy of promotional budget.

The overall promotional objective is to reach as many physicians as possible and educate them with respect to the feasibility of in-office on-line real time administrative automation. Furthermore, the vehicle through which this will be accomplished is the AMAS promotional plan using a variety of promotional techniques and employing the benefit set described earlier in this chapter. This will result in the purchase of service from AMAS and a general understanding and appreciation for automated services.

In discussing the AMAS promotional mix, four basic areas will be considered.

1. Advertising
2. Personal Selling
3. Professional Sales
4. Seminar Program

In dealing with the initial client development, a careful and methodical educational program must be developed to introduce the client to AMAS. This, of course, must be started well in advance of the proposed startup date. The promotional mix, in this case, will be quite different than the overall promotional mix listed above.

A possible mix could consist of the following promotional methods:

1. A formal invitation would be delivered to all prospective subscribers. Included in this invitation would be AMAS promotional materials, fact sheets, and service statements. The intention of the invitation would be to ask the physician to attend a luncheon (or something on that order) for a preview of the AMAS system and an opportunity to discuss the subject with AMAS staff and other physicians.

2. The luncheon would serve as an exhibit presentation of the AMAS system.

3. Attempt to set up follow-on personal meeting with each physician, to assess his requirements with regard to AMAS services and develop an estimate of charges.

4. For all those accepting the personal estimates, follow-on visits would be accomplished. For those not accepting visits, a mail campaign would be initiated.

5. Once the AMAS system is implemented, all subscribers would be invited to visit the AMAS offices to see, firsthand, the operation of their system.

6. Additional to the above, educational oriented activities, price-breaks and service premiums can be considered in the case of skeptical subscribers.

The objective in this introductory program is to gain the confidence of the physician, develop a reputation for the new system, and place the idea that service is the business of AMAS. Now that the startup promotional activities have been discussed, attention will be given to the recurring promotional mix mentioned above. The first area to be dealt with will be the advertising aspects of AMAS service promotion.

Advertising: In dealing with AMAS advertising, consideration will be given to all forms of media. Specifically, the following example of advertising technique could be employed.

1. Use of local or state wide professional publications advertisement. (Introduction/Continuous.)

2. General public notice as a lead story in local business in the area, newspaper's business section. (Introduction.)

3. Series of advertisements in the business section of the Sunday newspapers, in the local area, over a 4 to 6 week period, introducing and gradually educating the potential users in the features and services offered by AMAS (Introduction/Continuous.)

4. Consideration should be given to the use of local television spots so as to generally inform and educate the public of the type of medical oriented services offered by AMAS. This may also put the firm in front of potential users.

5. Radio announcements at the end of the business day could also provide for exposure of the service to a broad section of general public and the medical community.

6. The development of service literature that depicts the AMAS service and graphically demonstrates the benefits of AMAS. These materials can be used in selective mailing campaigns and as accompanying material with other promotional activities.

Advertising is helpful and provides general knowledge and information. However, personal selling will be the most effective promotional tool AMAS has.

Personal Selling: The area of personal selling will be the most important portion of the promotional mix in marketing AMAS. In dealing with any service, the use of personal selling accomplishes numerous activities. The explanation of the service, the tailoring of the product to the customer's needs, the overall education of the customer, customer identity with service and the continual follow-up and feedback communications are a few of the many activities accomplished.

The most important element to consider in this area is the

salesman. The salesman is, in the customer's eyes, the company. The impression he leaves, the knowledge he possess, and the service he renders are directly reflective upon AMAS. This is especially true in the selling of automated services. Therefore, a major effort should be made to obtain personnel who can project these company goals.

The need for personal sales in the marketing of AMAS is especially important. The AMAS concept is completely new, the idea of automating the physician's offices is foreign to most physicians, and the reluctance to change from the traditional practice methods that have been established over the years all require careful explanation and customer motivation.

Caution must be exercised in the choice of AMAS sales personnel. A first prerequisite must be knowledge of data processing and, in particular, knowledge of the concept, capabilities, and limitations of the AMAS system. Secondly, sales personnel must be personable, articulate, and possess a general understanding of professional and, in particular, medical business activities.

All sales personnel, under the guidance of the sales manager, should aid in the operational development of sales and promotional plans so that all available sales techniques are properly incorporated in the AMAS sales effort.

Professional Sales: The third area of the mix is professional sales. What is being referred to as professional sales are those sales of service accomplished through professionals in the community. In particular, an accountant, for example, might find that several of his clients could use the AMAS and, based upon his recommendation, decide to purchase the service.

This particular method of promotion is a very difficult and uncontrollable method. Not only is there a service to direct user obligation, but as an agent of the service, a secondary obligation is made to the professional. There are two approaches that can be followed in this area.

The first approach is to sell the entire service to the agent and let him provide the necessary customer relationships, billing, and general maintenance of the clientele purchasing the service. This approach is totally unacceptable to AMAS.

A second approach to this method is the referral approach. Here, the agent refers the client to the company and the company provides the necessary services directly to the client. This approach to professional sales is acceptable to AMAS.

The professional promotion of the AMAS is an important part of the overall promotional mix. The confidence and overall attention given to the AMAS by professionals will, to a great extent, determine its position as a viable business activity.

Seminar Program: In a continuing effort to place the AMAS service in front of the business community and to provide that additional general education requirement, a fourth element, the seminar, could be used in the overall promotional mix. In general, this program provides a show or exhibition method of promotion.

Programs of this nature could be conducted on a quarterly schedule. The objective of any specific seminar would be to demonstrate the applicability of the AMAS to a particular aspect of the physician's administrative task. For example, a seminar surrounding the system's applicability to medical histories could be presented in the first quarter,

the second quarter toward medicare billing, the third quarter toward practice analysis, the fourth toward general accounting and so on. In each case, a specific program would be developed for presentation at the seminar. Sales packages would be assembled and distributed. It would be necessary to accomplish this in a luncheon or similar format with specific invitations extended.

In accomplishing this program, two specific objectives have been met, specifically, the promotion of the AMAS and the further education of the general medical community. Even though this method is expensive and the future returns are difficult to measure, the benefits in exposure and overall product sales potential will be a positive offset of this expense.

As mentioned at the outset, the promotional efforts are of paramount importance. In dealing with the promotion of AMAS, a firm strategy must be developed which includes an adequate budget and strong managerial support. All of the various techniques and methods discussed must be considered and their mix will be dependent upon the budgetary constraints placed upon the strategy. Too much emphasis cannot be given to the idea that promotion must be goal oriented and any expenditure must be looked upon as an investment in the future sales of AMAS. Every effort should be made to program the promotional budget right on top of the overall operating budget of the firm.

Service Availability and Access

The market area for the AMAS services will include the immediate locality only. That is to say, the city of residence and outlying communities within fifty miles. This condition should exist until the AMAS

company is firmly established and completely proofed out economically and technically.

In defining the market area, there are two classes of users. The first of these is the off-line user. This is the physician that sends the treatment sheets, tape recordings and accounting ledgers to AMAS via the AMAS delivery system. This type of user must be restricted to the local community with an average travel distance between AMAS and his front door of no more than 15 miles. The second class of user is the on-line user. This user conducts all his business with AMAS through the use of electronic and communication devices. His only location restriction is his access to telephone lines.

The output of the 25 products listed earlier will be accomplished through the use of delivery and mail for the off-line users and CRT display for the on-line users. Additionally, if large practices desire, a printer device could be located in the practice offices for immediate document output.

A final area to consider is the expansion of the service area. With respect to this consideration, there are two ways in which expansion could take place. The first area is expansion of client types. That is to say, the adaptation of the basic AMAS services to dentistry, veterinary, psychiatry, podiatry, counseling services, and medical laboratories. In expanding in this way, AMAS is simply adapting a general set of business programs to a closely related sister profession. The second area of expansion could be in the branch operations area. In this case, the use of distant data collection devices would be developed. These devices would be located in satellite input/output stations where data would be stored and transmitted in a time sequencing fashion. In

this expansion concept, the general physician service would be extended beyond the limits of the local community and would include the servicing of a multi-community medical clientele.

Summary

In developing the AMAS marketing approach, the basic product construct was presented as a service benefit system and a benefit set. In approaching the problem presented to the AMAS marketing approach, four basic areas were developed.

In viewing the AMAS service as a product, the five service lines were defined and the mix was expressed in terms of these five lines and the 25 associated outputs. The idea of quality as a central element of the service was also discussed.

The AMAS service pricing decision was discussed in general terms, outlining methods of demand estimation, cost estimation, profit determination and pricing techniques. No attempt was made to establish specific service prices.

The AMAS promotion plan was covered in some detail. The areas of advertising, personal selling, professional sales, and seminar programs were discussed in terms of their applicability to AMAS.

The ideas of service availability and access were discussed. The local community market area was developed. Concepts of off-line and on-line users were contrasted. Expansion of AMAS services was briefly discussed.

This chapter completes the discussion of the Automated Medical Administrative System Services. To this point, the basis for discussion was developed with a study of the medical community in Great Falls,

Montana. The AMAS system was defined, the organizational entity developed, and the marketing approach discussed.

CHAPTER VI

CONCLUSION

Restatement of Objective

The purpose of this paper was to explore the development of an Automated Medical Administrative Services business, the purpose of which would be to provide administrative services for sole practitioners or group practice physicians. The findings and developments within this paper indicated that the development of such a business would be entirely possible. This conclusion is based upon the successful development of the system, management and marketing of the service. Further, the resulting construction of AMAS is defined in a general framework that would be applicable to any area that establishment of AMAS would be desired.

Establishment Considerations

Based upon data gathered in the survey of Great Falls, Montana, and the final construct of the AMAS business character, the following considerations should be pursued with regard to the establishment of the AMAS business.

1. To provide the overall line of services desired, the market area must be able to provide a population of a minimum of 200 to 500 physicians and an additional 150 to 350 collateral medical specialties. This is due to the traditional conservative nature of the physician.

2. In developing and constructing the system, the following should be considered.

a. Developing the system around a cluster of mini-computer systems, each devoted to a specific function or activity.

b. In obtaining the computer system and equipment, a request for quotation (RFQ)¹ method should be used to insure all facts and data are obtained prior to applying the two step approach described in Chapter III.

c. Current software available on the market should be evaluated for possible use to save on development cost.

3. Advance marketing studies should be conducted and advance market development are extremely important in the successful establishment of AMAS.

4. If it is at all possible, the stand alone configuration discussed in Chapter III should be employed to allow for the total AMAS approach to development.

5. The use of an already established business situation will provide for a framework on which to apply the AMAS concept of operation. Such businesses as accounting, legal and the like, would provide the best basis for this approach.

These are only a few of the considerations that could be made in establishing the AMAS as an operational business. The attention given to the three basic areas of the AMAS is felt sufficient to place a firm grasp on the problems and solutions of the service in general.

At this point, it could be said that the study phase of the AMAS plan, as discussed in Chapter IV, is completed. The next step for AMAS is to go to selection and preparation. However, that effort will be reserved for a future date.

¹An example of such an RFQ is that which was prepared by the University of Montana, Request for Quotation for Freestanding Mini-computer System, September 13, 1973.

Recommendations for Further Study

The use of automated systems in the medical professional services has potential for many other applications. As additional services to add to the service line of AMAS, consideration and study could be given to such areas as automation of private clinical laboratories like those discussed by Levine² and Dickson,³ or patient testing data automation acquisition.⁴ These types of applications are the automated products of the future. Like most service oriented businesses, the beginnings of the product are found in common applications like the administrative task applications of AMAS. In the world of cybernetics, the sky is the limit and the use of automated techniques in the physical examination and treatment of man is just around the corner. Therefore, if AMAS is to be a viable lasting enterprise, study in these areas must be accomplished.

²G. B. Levine, "Advantages of Computer System in the Clinical Laboratory," Hospital Progress, June 1976, p. 66.

³J. F. Dickson, "Automation of Clinical Laboratories," Proceedings of the IEEE, November 1969, p. 1941.

⁴J. R. Londall and C. A. Caceus, "Automation of Data Acquisition in Patient Testing," Proceedings of the IEEE, November 1969, p. 1941.

APPENDIX I

UNIVERSITY OF MONTANA



SCHOOL OF BUSINESS ADMINISTRATION
AFIT MBA PROGRAM
MALMSTROM AIR FORCE BASE, MONTANA 59402
(406) 731-3428

Dear Doctor

I am Joseph A. Duquette, a student in the University of Montana, AFIT MBA Program, studying for a Masters Degree in Business Administration. A requirement for completion of this degree is the writing of a professional paper on some business or business related topic. With regards to that, I am writing my paper on The Development of An Automated Medical Administrative Services Business.

To complete my research, it is necessary to compile field data on this topic. To accomplish this task a questionnaire has been developed and I have selected fifty doctors, at random, from the telephone book to complete the questionnaire.

Your cooperation in the completion of this questionnaire will be greatly appreciated. I further, wish to assure you that your answers to the questionnaire will be held in the strictest of confidence and that no attempt will be made to identify you with your responses. Your answers will be added to the pool of answers gathered and from this pool generalized statements and inferences may be made with regards to my study topic. Data on this topic is very-limited, if not totally unavailable. It is therefore, of crucial value to my study.

Attached is a postcard addressed to me. If you would like a copy of the questionnaire results please fill the card out and mail it to me. I will be more than happy to provide you with the results of my study.

Sincerely yours,
Joseph A. Duquette
MBA Candidate, University of Montana

Attachments:
1. Questionnaire
2. Postcard

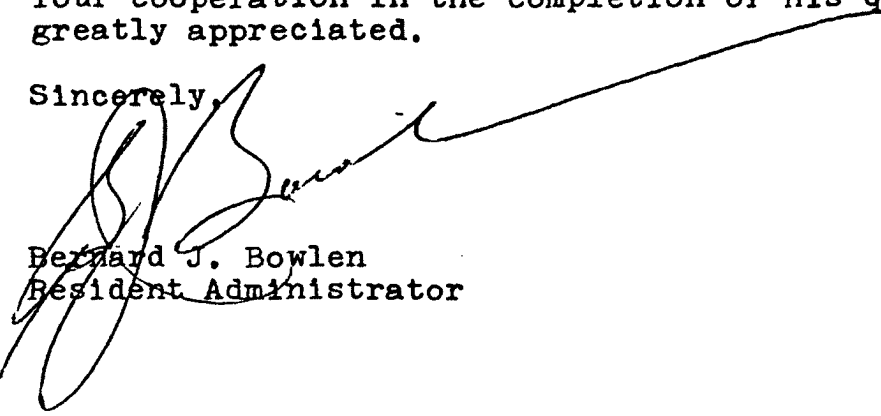
1st Ind;

From: Dr. B. J. Bowlen
Resident Administrator
AFIT - MBA Program
University of Montana
Malmstrom AFB, MT 59402

Dear Doctor:

Mr. J.A. Duquette is a student in our program. His course of study will be completed with the paper he is currently working on. Your cooperation in the completion of his questionnaire will be greatly appreciated.

Sincerely,



Bernard J. Bowlen
Resident Administrator

APPENDIX II

FIELD DATA
QUESTIONNAIRE

FOR: The Development of An Automated Medical Administrative Services Business, An MBA Professional Paper

BY : Joseph A. Duquette
Grad. Student of Bus. Adm.
University of Montana, AFIT - MBA Program

Date Prepared: 1 September 1976

Please Complete By:

Date: _____


NOTE: For use in completion of a professional paper to be presented in partial fulfillment of the requirements for the Degree of Master of Business Administration.

NOTE: Please do not make any identifying marks on this questionnaire. Instructions on the following page.

INSTRUCTIONS:

1. This questionnaire is in three parts:
 - a. General Questions
 - b. Questions on Costs
 - c. Questions on the Service
2. Please answer questions by filling in the appropriate blanks or marking the applicable boxes.
3. If you wish to make additional comments, please feel free to use the back of the sheets provided.
4. Please complete this questionnaire by _____.
Return to me using the attached (see last page) stamped and pre-addressed return envelope.
5. If you have any questions or require assistance in completing this questionnaire, please contact me at 727-2506. If not at home, my wife will take the message and arrange for a call back to you.

Thank You,


J. A. Duquette

I. General Questions:

1. When did you start practicing medicine? _____

(Year)

2. What form of medicine do you practice?

 G.P. Specialists _____ Other

(Type)

3. Which of the following forms would you consider your practice to be?

 Sole Practitioner Medical Partnership, How many in partnership _____? Incorporation Other (Please Specify) _____

4. What are your office hours? _____

(Days)

(Hrs)

5. Do you have hospital rounds?

 YES NO

If yes, indicate the following _____

(Days)

Hrs)

6. What is your average daily patient load (office hours only)?

_____ / day.

7. On the average, how much time do you spend with each patient you see (office hours only)?

_____ mins./patient.

8. Do you operate your own laboratory facility?

 YES NO

9. Do you consider the administration of your practice a major activity?

 YES NO

10. Briefly define your administrative task. (use back if necessary)

II. Cost Data Questions:

1. Do you employ anyone who, either part-time or full time, deals with your administrative task, if yes, answer (a) thru (e) below ?

YES NO

(a) How many people full time? _____.

(b) How many people part time? _____.

(c) List the task performed by each employee, indicate (P) for part time and (F) for full time.

<u>Employee</u>	<u>Task</u>	<u>P or F</u>
<u>1</u>	_____	_____
<u>2</u>	_____	_____
<u>3</u>	_____	_____
<u>4</u>	_____	_____
<u>5</u>	_____	_____

(d) What is the total annual, Average monthly, and average weekly cost of this employment?

\$ _____/Year \$ _____/Mo. \$ _____/Wk.

(e) Do you share employees with other physicians?

YES NO

2. What are your approximate annual administrative costs?

\$ _____/ Year

3. How much of your time do you devote to office administration?

_____ Hrs/Wk

4. Do you have administrative equipment rental (or similar) costs?

YES NO

If yes, what are your monthly costs?

\$ _____/ Mo.

5. Do you have outside help (service agency etc.) in any of the following administrative task? If yes, indicate monthly costs.

<u>Task</u>	<u>YES</u>	<u>NO</u>	<u>Cost/Mo.</u>
___ General Accounting	___	___	\$ _____
___ Billing	___	___	\$ _____
___ Medical Record Keeping	___	___	\$ _____
___ Third Party Billing	___	___	\$ _____
___ Practice Analysis	___	___	\$ _____
___ Management Reports	___	___	\$ _____
___ Appointments	___	___	\$ _____
___ Answering Service	___	___	\$ _____
___ Paging Service	___	___	\$ _____
___ Medical Studies	___	___	\$ _____
___ Other - _____	___	___	\$ _____
___ Other - _____	___	___	\$ _____

Of the tasks listed above, rate each task; on a scale of 1 to 10, where 1 is the lowest and 10 is the highest; on the basis of time required to complete the task. Indicate your rating in the space to the left of the task listed.

6. Are there any other cost, in terms of time or dollars & cents, that should be considered in the evaluation of your administrative task? Please discuss below.

III. Service Questions:

1. Have you, in the past, or do you currently subscribe to a service agency of any type for the purpose of assisting you in your administrative tasks ?

YES NO

2. Do you feel that portions of, if not all of, your administrative task could be efficiently and effectively automated.

YES NO

3. Given the following description of a medical services business, answer questions (a) thru (j) below.

Description: A business that would, through the use of a computer system provide the following services:

1. Appointment scheduling for either a single practitioner or a group. Providing the doctor with a detailed breakdown of each appointment, on a daily basis.

2. General accounting for your entire practice. This would be accomplished by a simple in office entry system. The end product would be a complete set of journals and various management reports.

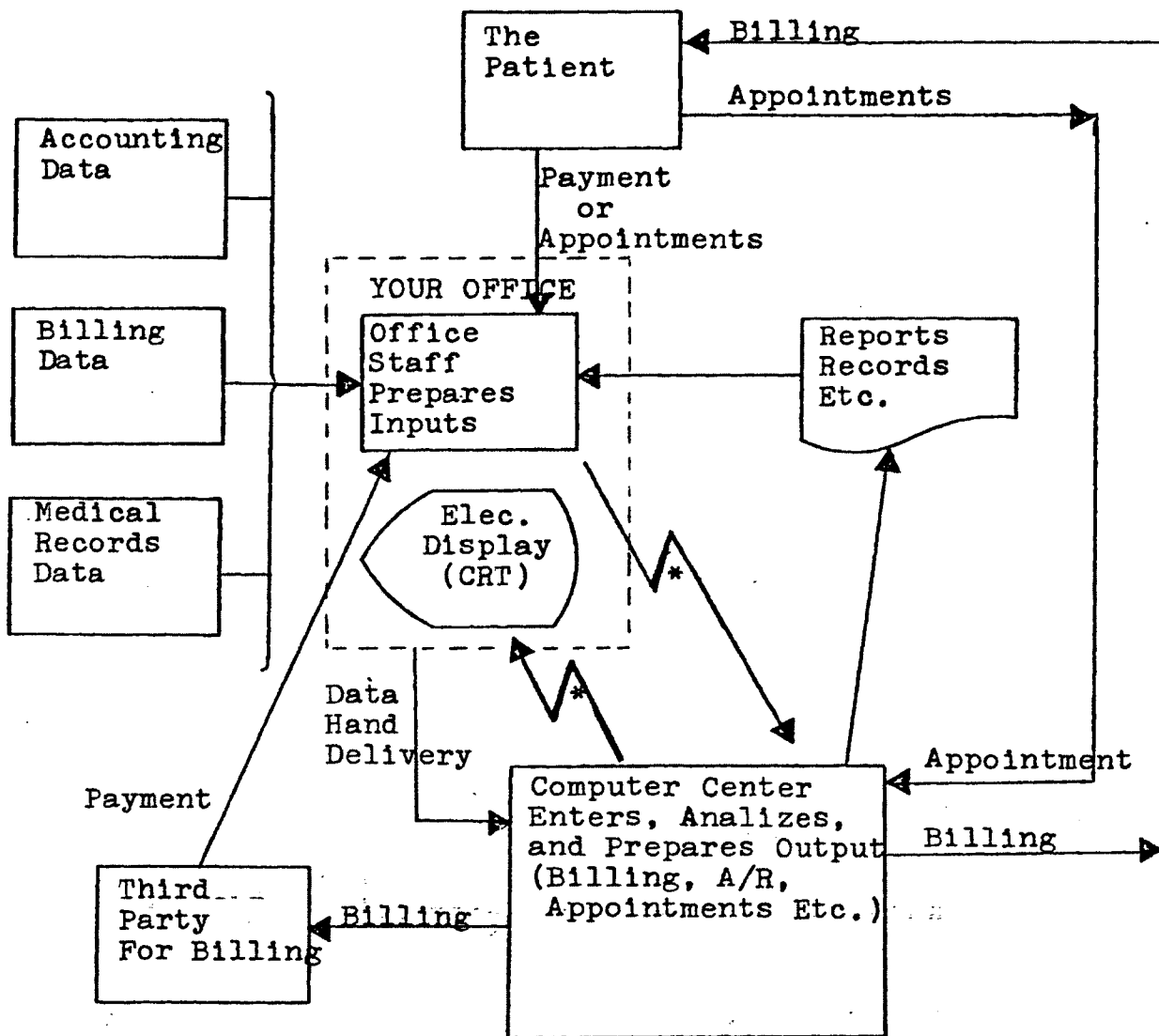
3. Automated billing system, providing quick and accurate billing techniques. Receivables ledgers aged, or by any index could be provided to the physicians given a 24 hr. notice. This to include third party billing, such as medicade, welfare, or other similar types.

4. Medical record synopsis, the purpose being to summarize relevant patient data and reduce the hand input requirements. Statistical as well as medical words would be automatically inputed to the patient file.

5. Management reports of group practice would be provided to each member of the group on the basis of diagnosis of procedures performed or simply on the procedures performed. This is also applicable to the private practice.

6. Other specialized or tailored services could be offered as required by the physician.

The method of operation would be as follows:



* Denotes telecommunication link. (Optional)

(a) Would such a service be of use to you?

YES NO

(b) Would only a portion of such a service be of use to you ?

YES NO

If yes, circle those applicable 1 2 3 4 5 6

(c) Do you feel that a service of this nature would minimize your administrative task ?

YES NO

(d) How much would such a service be worth to you on a monthly basis ?

\$ _____ / Mo.

(e) Would a historical summary of an individual patient record be of value to you in patient visitation? (ie. lab data, vitals info, treatment abstract, physical profile etc.)

YES NO

(f) Would you use a computer service of this type for specialized or tailored services ?

YES NO

(g) Would you incur the added expense for telecommunicative capability with the computer center ? (\$50 - \$100 per mo.)

YES NO

If no, how much would you spend \$ _____ ?

(h) Which data output devices/methods would you prefer ?

Hand Delivered by Messenger (Documents)...

Television Display (CRT)

Printer Device.

(i) Of the first five services mentioned, list the order of priority to you, (1 being the highest and decreasing to 5 the lowest)

___ Appointments Scheduling _____

___ General Accounting _____

___ Billing System _____

___ Medical Records System _____

___ Management Reports _____

On the line to the right of each service above place a monthly dollar value to you.

(j) With regards to the system defined, check those areas that would be of concern to you.

Confidentiality of Patients Data

Cost of Operation

Management of Administration

Accuracy of Output

Legal Questions (Please Specify) _____

Other (Please List) _____

4. Would you be willing to join with a group of doctors for the purpose of establishing a rotating on-call schedule which would provide specialty coverage for all patient categories. The purpose of such a system is to simply make your free time really FREE.

YES NO

If yes, how much would you be willing to pay for such a service ?

\$ _____ / Mo.

5. Please make any comments, what so ever, that you feel are relevant to this study.

Your Cooperation is Greatly
Appreciated

THANK YOU *JAD*

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