

FINANCIAL FEASIBILITY OF A REGIONAL
REFERENCE LABORATORY

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BY
WINNIE BARBARA LALONE GERLOFF, B.S.

DENTON, TEXAS

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To my husband, Ron and
my sons, Scott and Mark

PREFACE

The growing concern over the rising cost of health care in the United States has prompted health care providers to explore ways to contain costs. The laboratory industry has been among those criticized and pressured by the federal government to reduce costs.

This study centers around one approach which a hospital management corporation undertook to contain laboratory costs. The research involved the establishment of a regional reference laboratory to service nine, corporation-owned hospitals in a large metropolitan area. The purpose of the study was to determine the financial feasibility of the project. Financial data were collected for one year, and income was extrapolated for a five-year period. These projections were analyzed financially to answer the feasibility question.

The writer acknowledges the support of the hospital management corporation toward the completion of the study. Acknowledgement is also extended to the hospitals who participated in the study and the employees of the regional reference laboratory who helped with the project.

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CHAPTER I

INTRODUCTION

The role of the clinical laboratory in assisting physicians in the diagnosis and prevention of disease has become increasingly important over the last ten years. Advances in technology, instrumentation, and manpower training have contributed to the expansion of this changing role. However, as with other areas of health care, advances along these lines have added to the escalating cost of health care. A concern among laboratorians, physicians, and administrators about controlling these costs has raised many questions about approaches which should be taken to alleviate or contain some of the costs.

An increasing concern has evolved during the previous decade over the spiraling cost of health care in the United States. In 1965 the expenditure for health care was \$39 billion, 5.9 percent of the gross national product. By 1976 the expenditure for health care was \$139 billion, 8.6 percent of the gross national product (Jonas 1979:248). This increase came in time association with the passage in 1965 of Titles XVIII and XIX of the Social Security Act and the inauguration of Medicare in 1966. Medicare costs alone

rose from \$5.3 billion in 1968 to \$26.1 billion in 1977 (Iglehart 1977:55).

During the latter part of the time interval, 1969 to 1976, the average cost per test of laboratory procedures rose from \$1.34 to \$1.54. More significantly, from 1969 to 1976, the number of tests per day increased from 2.3 to 5.0, which represented an annual increase of 11.1 percent. Therefore, although the numbers of tests per day had risen sharply over a seven-year period, the cost per test had risen more slowly (Phillips and Hai 1979:46). Many explanations of these escalating costs have been expressed. Included are advances in research and technology, the practice of defensive medicine, more complex care (said to shorten hospital stays), and the "cost-plus" reimbursement system by third party party payers (Iglehart 1977:55).

Regardless of the explanations which have been offered concerning the high cost of health care, the public and the federal government are pressing health care providers for cost containment. Many state governments have appointed committees to study the existing situation and work with hospitals for solutions. Congress has under consideration proposed laws to curtail health care costs, some of which will have an impact on the clinical laboratory in both the hospital and the commercial laboratory (Clinical Laboratory Improvement Act:1980).

Laboratories, because they are high revenue-producing departments in many hospitals, are being scrutinized closely. Regulations have been proposed by the Department of Health and Human Services, which would limit reimbursement for admission tests. Other regulations are pending which would limit reimbursement of laboratory tests to the lowest fee charged in the area. Due to impending laws and regulations, hospital management corporations, hospital groups, and independent commercial laboratories are considering regionalizing services to minimize costs.

A six-year shared services program between the Veterans Administration Hospital and the University of Missouri indicated sharing or regionalizing services could be beneficial (Townsend and Lucas 1979). Interviews with executives of a major national commercial reference laboratory also indicates a trend toward regionalizing to control costs (Aiken 1979). Thus, regionalizing clinical laboratory services appears to be feasible.

CHAPTER II

STUDY DESIGN

Statement of Problem

The problem addressed in this study concerns the financial feasibility of a hospital management corporation's establishing a regional laboratory. It is essential to the viability of the laboratory that it significantly benefit the corporation's profit structure while containing costs for the participating hospitals.

The investigative thrust of this problem is the microeconomics of shared services. The analytical foundation of this feasibility determination was an income projection for five years, based on financial data. Accordingly, the questions of this study concerning a regional reference laboratory are: (1) What are the bases in empirical data for computing pretax, preinterest income? (2) What are the annual pretax, preinterest income projections for 1981 to 1985? and (3) What are the profitability indexes in terms of the percent of return on the original investment and the pretax, preinterest pay back period?

Purposes

The purposes of this paper were threefold. First, the researcher used the empirical data reported in the

monthly operating statements from September, 1979 to May, 1980 to compute the income before tax and interest. These computations were averaged to provide the bases for the projections for the remainder of the financial analyses. Second, the investigator determined the pretax, preinterest income for 1981 to 1985. This determination was made by using the empirical data extracted from the monthly operating statements and projecting test volume, expenses, and revenue generated. These extrapolations yielded the pretax, preinterest income estimates for the five-year period, 1981 to 1985. Third, the writer determined the profitability of the regional reference laboratory by computing certain profitability indexes. These measures were the percent rate of return on the original investment and the pay back period in years. These computations were based on the data from the five-year income analysis before tax and interest.

Background

The decisional foundation for this study rests in a 1978 pro forma financial statement prepared by the hospital management corporation to determine the economic feasibility of a regional laboratory. This evaluation was based on a survey conducted in nine hospitals, which the corporation owns. The hospitals are located in a large metropolitan area, and range in size from fifty beds to two hundred and

fifty beds. In the survey the hospitals were requested to report the numbers and types of laboratory tests referred to outside laboratories, the fees charged, and names of the reference laboratories being used.

The findings of this 1978 study led the corporation to establish a pilot regional laboratory as a subsidiary corporation. The holding corporation bought an existing laboratory in the area, hired this writer as administrative director, and began operations. If the regional laboratory is feasible financially, the long-range plans are to establish regional laboratories in other areas where the corporation owns several hospitals.

Three major conditions were established as those necessary for the laboratory to be judged as successful, as follows. First, the service and quality of laboratory performance must be at least that which the hospitals are presently receiving from commercial reference laboratories. Second, the total cost of the tests referred to the regional laboratory must not exceed the costs which are being incurred from commercial laboratories. Third, it must be feasible financially for the corporation to operate a regional laboratory. It was further stipulated that the company-owned, reference laboratory preferably should be able to provide a better quality of service at less cost to each of the hospitals.

Methods

The unit of analysis for this study is the regional reference laboratory. The researcher collected the financial data generated in a nine-month period from September, 1979 to May, 1980. The data included gross and net revenue, operating and nonoperating expenses, and pretax, preinterest income. The data were taken from the monthly operating statements, which were calculated for each month of operation. Test volumes for each month were also collected, and the College of American Pathology workload (weighted) units (Workload Recording Committee 1980) were calculated.

An average for test volume, revenue, and operating expenses were calculated as a basis for extrapolations for the years 1981 to 1985. The corporation's senior vice president of finance has requested that all subsidiaries use a factor of eight to ten percent for projection purposes unless otherwise justified. This is a conservative estimate but consistent with the 11.1 percent annual increase reported by Phillips and Hai (1979:46). A ten percent increase in test volume, expenses, and revenue was added to the calculations for each year as a factor in this study to allow for probable increases. These calculations became the basis for the projected income before tax and interest.

The final calculations were profitability indexes. These measures included the percent rate of return on the

original investment and the pay back period in years based on the projected income analysis.

Instruments

The instruments used for the collection of financial data were three forms designed and used by the hospital management corporation to conduct financial analyses, discussed as follows. The operating statement (Appendix 1) is used to determine the financial status of each entity on a monthly basis. The other two forms to be used were extracted from the capital expenditure request manual, which is a detailed financial and narrative justification for any capital expenditure to be considered by the corporation. One is the pretax, preinterest income analysis (Appendix 2) and the other is the profitability indexes worksheet (Appendix 3).

The validity and reliability of these instruments have been established by the company. These instruments are valid for purposes of the company because they are accepted and used by the company to measure the variables named. The measures are reliable within the limits of unaudited financial reports and carry the consistency of the data generated for such management purposes as those of this report.

Assumptions

The researcher assumed that the data collected would indicate a trend in revenue, expenses, and test volume upon which projections would be established. Further, it was assumed that data for nine months of operation are sufficient to make projections for the five-year forecast. It was also assumed that the financial analysis which the corporation requests would enable the writer to determine the financial feasibility of the regional reference laboratory.

Delimitations

Although the hospital management corporation identified several conditions for the reference laboratory to meet for it to be successful, this study addressed only the question of financial feasibility. The study was further restricted to an examination of revenues generated from six of the nine corporation-owned hospitals in the area. (Hospitals not served by the laboratory are two psychiatry hospitals with little laboratory work and an acute-care hospital that refers very few tests to outside laboratories.) Further, the study was also limited to determining financial feasibility after the acquisition of an existing laboratory and equipment.

Definitions

The following definitions apply for the purposes of this paper:

1. Regional reference laboratory: An independent clinical laboratory which provides analyses of a special nature to physicians and hospitals in a geographic area.
2. Gross revenue: The total revenue generated by the laboratory tests prior to any deductions.
3. Net revenue: The gross revenue minus courtesy discounts and/or bad debts.
4. Pretax, preinterest income: The net revenue minus operating and nonoperating expenses.
5. Percent rate of return on original investment:
The average pretax income divided by the original investment.
6. Pretax, preinterest pay back period: The amount of time necessary to generate cash equal to the amount of the original investment.

CHAPTER III

REVIEW OF LITERATURE

Introduction

The foundation literature for this study centers around shared services. Mergers and antitrust laws are also discussed as related to the economics of shared services. A further review considers the causes of escalating laboratory costs as well as possible solutions for containing costs. Additionally, the financial management of organizational operations, including accounting principles for measuring and projecting the economic success of an operation are explored. A discussion of each of these topics follows.

Shared Service

Shared service is one option being considered among health care providers to enhance the quality of care while addressing the microeconomics of cost containment. There appears to be a need for new organizational structures in the health care industry, and there is to this end an interest among providers in pursuing shared services. The need to meet government regulations and hold down costs are major reasons cited for considering shared services. The literature described actual and proposed advantages of shared services as well as disadvantages.

New Organizational Structures

An underlying problem of organizational effectiveness in the health care industry appears to indicate a need for exploring new organizational structures in order to close the gap between expectations and performance (Georgopoulos 1972:2-3). Further, there is a gradual redefinition of the institutional role of the hospital as a health care center. Evidence of such role changes are associated with programs which have been initiated, such as Medicare and Medicaid, regional medical programs, the emphasis on comprehensive health planning, the development of continuing education programs, and institution of health maintenance organizations. These changes are forcing hospitals to alter many aspects of their traditional character and organizational functioning (p. 4).

The type and magnitude of restructuring and reorganizing among health care institutions will depend heavily on the present organizational system of hospitals. Restructuring of the organization will relate to past experience and future trends. It will relate also to the objectives and problems of the present system, the composition and characteristics of organizational groups and subsystems, the type of work to be done, the professional relationships and behavior in the system, and the organization-member and organization-community relations of existing systems (Georgopoulos 1972:5).

The most important changes that occurred in health care during the decade of the seventies were structural and organizational rather than medical and technological. The increase in multi-institutional arrangements has been one of the major changes. Included under multi-institutional arrangements were multihospital systems, shared services, consortia, vertically linked organizations, and other collective ventures. Hard evidence was being sought in 1979 to document the perceived advantages of the multi-institutional trends. There is evidence that only now are data being collected, and much of it has not begun to appear in the literature (Wegmiller 1980:147). That which has appeared is exemplified by Lauback, Rand, and Lauback (1980:8).

The literature indicated that shared service arrangements among hospitals were increasing. For example, some of the data from the 1978 American Hospital Association survey revealed that shared service arrangements increased from 61 percent in 1975 to 82 percent in 1978. There is also literature available on vertically linked organizations and multihospital systems. This can be interpreted as a possible trend in the 1980's toward the formation of larger organizations of multihospital systems and the expansion of hospital management company efforts to include international ownership and management of health care facilities. Hospital management is beginning to feel more secure about interinstitutional

relationships and are more willing to trade autonomy for access to broader community health care delivery (Wegmiller 1980:148-149).

There is a need for further research to determine the full potential of shared services as an approach to reorganization (Astolfi and Matti 1972:61). A recent interest in the varied applications of shared services has been indicated. Astolfi and Matti's (pp. 61-65) report was an analysis of a national survey conducted in 1971 which was designed to gather uncompiled data to assist health care providers with shared service programs. The survey revealed that,

Of the 5,727 short-term community hospitals contacted, 82.5 percent completed the survey questionnaire and of these, 66.6 percent reported that they shared from 1 to 73 services with an average of 6.2 services shared per hospital (p. 62).

Two of the top five shared services were laboratory related. The authors indicated that the results of the survey clearly showed present involvement and strong interest in the development of future sharing programs (p. 65).

Governmental Regulations

Brown (1976:41) revealed that he expected a rapid growth in regional health care systems with branch hospitals, intensified shared service organizations, and contract management of hospitals. The necessity for these changes in health care delivery, he attributed to federal regulations

and laws enacted over the past few years. He also cited expensive equipment, higher degrees of expertise, comparative cost control data, and other such factors as contributors to the change (p. 46).

It has been recommended that hospitals trying to comply with governmental pressures to increase services and contain costs establish for-profit service organizations. The indication is that through the intricate mechanism of a for-profit corporation, hospitals would have the incentive to share services. Areas which have been recommended for consideration were purchasing, food, personnel, and other similar service areas. Further, it was suggested that the profits be shared, based on the volume generated by each participating hospital (Fritschen 1978:22-37).

Advantages and Disadvantages

A case study was reported in Ontario, Canada regarding shared services between two hospital laboratories, located three blocks apart. The increasing demands for laboratory services and requests from the government and the community for quality improvements and cost containment precipitated their sharing services. After overcoming such obstacles as tradition, religion, local politics, hospital autonomy, language, objections from nurses and physicians, and insecurity within both laboratory staffs, the philosophy which evolved was that it was better to consolidate voluntarily,

under conditions that could be controlled, rather than by fiscal restraint or government directive (Frazer 1980:89). The consolidation of services was gradual and enabled the laboratories over a seven-year period to operate more effectively and efficiently. Both laboratories were directed by the same pathology group, which insured unified leadership. Services were divided between the two hospitals, a courier service was retained, necessary equipment was purchased, joint purchasing of supplies was established, and policies and procedures were standardized. In 1977 the total fiscal savings realized by sharing services was \$83,200 (pp. 90-104).

A program of shared laboratory services at the Veterans Administration Hospital and the University of Missouri Medical Center in Columbia, Missouri (Townsend and Lucas 1979:107-112) began because the medical staff was the same for both hospitals. The medical staff had many subspecialties, and were making increased demands on the laboratories of both institutions. It was anticipated that by sharing services the following benefits could be expected: (1) minimized duplication of space, equipment, and personnel; (2) increased availability of procedures; (3) enhanced quality assessment; (4) uniform standards; (5) increased effectiveness of the pathologist as a consultant; and (6) broadened availability of professional expertise (pp. 107-108). Having observed the successful operation of

the project for six years, Townsend and Lucas believe the few problems they encountered have been overcome and the program is worthwhile. They recommend shared services as a method of providing a better quality of care at a savings in cost (p.112).

Amador (1978:337-352) compiled a comprehensive review of shared clinical laboratory services. He proposed various structured figurations of shared services and detailed problems and advantages of shared services. Some of the potential problems he foresaw were unavailability of emergency tests, slow service, underutilization of existing facilities, loss of teaching facilities, unresponsiveness, and increased costs. However, he also outlined potential advantages such as providing new information to physicians, educating physicians and technologists, pooling of human resources and equipment, use of automation for large-volume testing, unification of procedures, quality control, and reagents, and a central administration (pp. 344-350). Contributing forces favoring regional laboratory services are rapid turnaround times, high volume workloads, physician and personnel convenience, and test accuracy and cost. A shared system will also provide a stable base of operations for professional personnel with a wide range of skills to utilize their skills to maximum advantage (pp. 350-351).

Perna (1980) indicated that there has been a 14 percent average increase per year for the past five years in laboratory tests referred to the reference laboratory which he directs. He attributed the growth to new technology and volume-sensitive economics. As he explained, many hospitals do not have enough volume to justify the purchase of expensive instruments and the increase in manpower necessary to provide their patients access to new technological advances in laboratory medicine. However, a regional reference laboratory can purchase the instrumentation and sell the service to a large number of hospitals and physicians, thus, generating a large volume and rendering the new service cost effective. He indicated that with a 50 percent increase in volume, the cost of performing a test will decrease 74 percent.

Although Perna (1980) was not at liberty to elaborate on future plans for the laboratory he directs, he did agree with this researcher that the trend in laboratory medicine is toward regionalization of laboratory services. This trend is a result of hospitals desiring to provide cost effective, high quality health care.

Mergers

It has been suggested that future trends in health care are toward large multi-institutional systems. Health care costs are continuing to escalate, owing, in part, to

poor articulation among the organizational components of that which traditionally has been a cottage industry. These evolving systems will be a result of mergers or consolidations between two or more existing institutions. The holding company has proved to be a viable vehicle in the business community for accomplishing this end. A discussion of the background, and trends of health care mergers, multi-institutional systems, and the mechanism to attain the consolidation of organizations as they relate to the health care industry will follow.

Background and Trends

The business community began a trend toward the fusion of organizations in the 1960's (Platou and Rice 1974:15-24). Although many have expressed interest, providers of health care have not actively pursued mergers. While an American Hospital Association-reported trend toward mergers was confined to a small number of the total health care facilities, there has been no in depth research in the area of health facility mergers (Starkweather 1970:4-6). However, the cost of health care will continue to rise, and many independent institutions will be forced to become integrated into large, multihospital systems.

The multihospital system of the future will be founded on a stronger financial base, a centralized decision-making process, greater financial and management expertise, and a profit-motive approach to health care delivery (Olson 1979:141).

The decade of the seventies and the last quarter of the twentieth century will be the era of mergers in health care (Sieverts and Sigmond 1970:261). Sieverts and Sigmond discussed five reasons why mergers would become prevalent. The reasons given were: (1) "critical mass" or the volume necessary for a service to be feasible economically, (2) the need for institutional renewal or new organizational structure, (3) the scarcity of resources, (4) the trend toward funding for coordinated development, and (5) geographic maldistribution (pp. 261-262).

Sieverts and Sigmond (1970:262) stated that mergers would be forthcoming, but would not be a simple task to accomplish. They recommended time, patience, a sense of humor, and a good legal counsel. They also indicated that a major research effort, exploring the merger, be encouraged in order to be prepared for the inevitable (p. 263). Following this indication, Lauback et al. (1980:8) have researched and prepared a paper for the American College of Hospital Administrators which outlined mergers as one alternative organizational approach for cooperation in health care.

Zuckerman (1979:4) cited the following reports and legislation as relevant to the trend toward multi-institutional systems. In 1965 the American Hospital Association in its Statement of Optimum Health Services indicated the need for "coordinated community and regional systems of

facilities and services." The Barr Report, a 1969 Report of the Secretary's Commission on Hospital Effectiveness, noted the desirability of "combinations of hospitals as well as interhospital cooperation and coordination." The regional Medical Programs and the Comprehensive Health Planning Act of the mid-1960's clearly intended regionalization, cooperation, and integration of facilities and resources. The Health Resources Planning and Development Act of 1974 provides specific encouragement of interorganizational arrangements, and specifically mentions shared services.

Multi-Institutional Systems

According to Zuckerman (1979:3), for years hospitals have existed as autonomous institutions. Recent pressures for cost containment and sharing of services have initiated multi-institutional systems. The growth and development of this type of arrangement represents an attempt, through organizational integration and consolidation, to restructure the hospital industry from within. Hospitals are recognizing the need to work together by joining skills and resources in order to meet the challenges facing them.

Further, various organizational typologies are categorized as multi-institutional systems. Included are multiple ownership and single ownership. Under multiple ownership are included shared services, consortia, management contracts,

and leases. Under single ownership are decentralized and centralized ownership. Those hospitals owned and operated by Catholic orders are usually examples of decentralized management under single ownership. Some examples of centralized, single-ownership systems are found among satellites, holding companies, investor-owned chains, hospital authorities, and merged institutions (Zuckerman 1979:10-12).

Benefits of multi-institutional organizations listed by Zuckerman (1979:12) included economic, manpower, and organizational advantages. He also discussed problems which multi-institutional systems must consider including antitrust laws, Federal tax laws, and existing reimbursement systems. Despite the barriers, there is evidence indicating that the hospital industry is evolving from independent facilities into multi-institutional organizations. The emerging organizations offer substantial promise to both the institutions and the communities they share (p. 40).

Mechanism for Merger

There is a belief that reorganization of the health care industry into coordinated systems is inevitable. An analogy has been made of the future of hospital holding companies to the holding companies which developed in the banking industry. New approaches to the provision of health care are urgent and unavoidable. Three trends which signify the necessity of multihospital holding companies are: (1)

single institutions beginning to give way to larger, incorporated networks of facilities and services; (2) individual hospital departments or functions beginning to combine into community-wide, shared service ventures; and (3) sharply increasing government guidelines, standards, and regulations (Platou and Rice 1974:15-24).

The holding company is a vehicle for retaining the ethical principles upon which health care facilities were founded and for providing strong sophisticated management, according to Platou and Rice (1974:17). These authors further believe a health care holding company could improve the quality of patient care through its ability to provide a coordinated, comprehensive range of services, intramural reviews of performance and facilities utilization, and ongoing interorganizational staff training and development (p. 19). Additionally, the holding company could stimulate medical, capital, and operational efficiencies as well as ensure the delivery of health services in diverse institutions in various community and regional areas (p. 20).

Antitrust Regulation

A treatment of changes in the health care industry relating to shared services, costs, and mergers necessitates a review of antitrust considerations, because of the legal

ramifications involved in mergers. Section 7 of the Clayton Act (Thompson 1979:70-73) and the Federal Trade Commission as they relate to mergers of health care institutions will be covered, as follows.

The regulatory pressures to reduce costs could result in consolidation and affiliation among providers of health care. Existing chains and group affiliations are perceived to have advantages in competing for facilities, physicians, and administrative staff. Beyond the economic feasibility and improved quality of care is the ramification of possible antitrust law violations which must be considered in any merger, consolidation, or affiliation (Thompson 1979:70-71).

A key factor in antitrust law is the market impact of the lease, management contract, or actual consolidation. There are three classifications of consolidations. Horizontal consolidation is the merging of competitors in the same business. Vertical mergers ordinarily involve entities in a buyer-seller relationship. Conglomerates involve entities that technically are not horizontal or vertical, but may be involved in complimentary services or products (Thompson 1979:72).

The federal law which applies to corporate consolidations is Section 7 of the Clayton Act. This section prohibits a corporation engaged in interstate commerce from acquiring the stock or assets of another corporation where

the market impact will be a reduction in competition or the creation of a monopoly (Thompson 1979:73).

The Clayton Act applies only to corporations and does not apply to partnerships or unincorporated associations. Given that an acquisition is a purchase of assets rather than stock, the Federal Trade Commission excludes nonprofit corporations from its jurisdiction. If the nonprofit corporation acquires stock rather than assets, then the Clayton Act is applicable. Section 7 also excludes the purchases of stock to be held for investment and not to be used in voting to restrict competition (Thompson 1979:73). A major financial management consideration in mergers and consolidations is the greater probability that neither the Antitrust Division of the Department of Justice nor the Federal Trade Commission would bring a suit to block a merger or consolidation. However, this circumstance should be explored carefully. The government must prove, under Section 7 of the Clayton Act, that there would be a "substantial lessening of competition" if the merger or consolidation occurred. Due to the excessive expense of an anti-trust battle, managers should be reasonably certain that they will not be challenged before continuing with a combination of organizations (Horne 1971:592).

Cost

The rising cost of health care in general and the escalating cost of laboratory testing specifically are influenced by many variables, with varying effects. Included in these variables are increased demands for a higher quality of medical care, advances in new technology, and federal regulations governing reimbursement. These variables are discussed as follows as well as the effects of cost containment on the quality of health care.

Increased Demands

There are a number of reasons for the increased demand for medical care, all of which have had an impact on the sharply escalating costs. Among the factors included are increases in volume, increases in the number of older persons in the population, higher educational levels and greater health awareness, urbanization of the population, relative increases in the number of health care providers, and the growth of third party payments. However, the single most important contributing factor has been the tremendous advances in medical technology to which all individuals have a fundamental right (Sorkin 1975:10).

Wertman, Sostrin, Pavolva, and Lundberg (1980:2080-2082) studied the reasons why physicians order laboratory tests. They noted that the number of clinical laboratory tests performed had increased markedly over the past few

years. This increase has been a major factor contributing to escalating health care costs. The need for the increase in the number of tests has been questioned by both the public and the government as to cost effectiveness. The findings of the study revealed that the majority of laboratory tests were ordered for diagnosis, screening, and monitoring. The study further indicated that the results of two-thirds of the laboratory tests ordered contributed to a change in diagnosis, therapy, or prognosis, while one-third of repeated laboratory test results showed an important change from the previous result. Therefore, Wertman et al. (p. 2082) concluded that laboratory tests are ordered for realistic medical purposes, and a large percentage of laboratory results are used to provide improved patient care.

New Technology

The rapid technical advances in laboratory medicine and the increasing demands for laboratory tests have contributed greatly to the rising costs. Additionally, the trend in laboratory medicine has moved from tests performed primarily for diagnosis to tests performed for monitoring the progress of therapy. A recommendation to aid in diagnosis and monitoring was a computerized data base of shared information with input from not only the clinical laboratories, but all the medical disciplines. A physician, via a compu-

ter terminal, could then request results and diagnosis-related data as necessary (Brecher 1978:615-616). It was further indicated that advances in technology have increased the number of tests ordered per patient day, thus adding to rising laboratory costs. However, the advances in technology have shortened hospital length of stay which have, in turn, been responsible for a decrease in costs (Phillip and Hai 1979:47).

Given that new technology has received much of the blame for the rising cost of health care, Gallwas (1980:86) argued that the opposite is true. He explained that new technology and its proper use lower health care costs and improve services.

A prevailing sentiment is that new technologic procedures and systems have been introduced into the health care system with little thought for their relative effectiveness, efficiency, or benefit. This attitude has become one of the major factors contributing to the cost containment movement. Since the 1978 annual cost of laboratory services exceeded \$12 billion, the public and the federal government have become very skeptical of the development and introduction of new technology (Gallwas 1980:86).

It has been suggested that investment in new technology offers one of the answers to decreasing costs through improvement of productivity. While about 70 percent of

hospital costs are attributed to labor, by contrast, only 40 percent of the laboratory costs are so assigned. New technology, specifically automation and computerization, could be responsible for the difference. Therefore, to contain cost, labor must be contained and productivity encouraged (Gallwas 1980:87).

New technology should also be introduced only when its benefits to the patient outweigh its cost. Proper utilization is the key issue if continued capital investments are to be made for new technology to improve health care (Gallwas 1980:87-90).

Reimbursement

The cost problem can best be approached from the perspective of cost accounting. Pending Medicare regulations which propose to base reimbursement on the lowest cost in the area will be detrimental to hospital laboratories (Roth 1979:97). Such an outcome can be attributed to the difference between higher hospital charges and lesser commercial laboratory charges. Hospitals must charge more per test because they provide services which commercial laboratories do not. Such differential services include personnel and supplies for specimen collection, specimen processing, "stat" services, direct patient billing, accepting of Medicare and Medicaid assignments, charting, availability of low volume, unprofitable tests, availability of

pathologists for consultation, audits, and continuing education. A solution is to lower cost per test in hospitals and charge separately for the added services listed above (pp. 97-98). No mention was made of central laboratories as a possible solution.

Governmental moves to hold down laboratory costs have had the opposite effect on hospital laboratories. Two pending regulations propose to eliminate payments for routine admission profiles and to institute the "lowest available fee" as the method of rate setting. In the past, the Health Care Financing Administration paid for laboratory tests for Medicare and Medicaid patients as the "usual and customary fee." Under the proposed regulations, the administration will pay only the "lowest available fee" for any given test. Since independent reference laboratories provide laboratory tests at approximately one-third the fee of most hospital laboratories, they are the most likely recipients of the work. The higher fees in hospital laboratories cover the added services which hospitals must provide, such as "stat" testing, specimen collection, special services, pathological services, and hospital indirect costs (Johnson 1980:55-59).

The elimination of the payment for admission profiles is another proposal of the Health Care Financing Administration. The argument is that the profiles are not cost effec-

tive. As Johnson (1980:61) points out, the physician will most probably order the profile sometime during the patient's stay possibly at an irregular time or "stat." This process will create inefficient and expensive testing patterns and offset any savings under the policy.

Effects of Cost Containment

A survey was conducted to determine where the pressure for cost containment in laboratories originated and what impact the pressures had upon the laboratories. The study revealed that the most pressure came from the respondents' own institutions with the remainder coming from local, state, and federal governments as well as third party payers (Kull 1980:36).

The impact of institutional and governmental pressures for cost containment was reported as both positive and negative from the respondents (Kull 1980:37). On the positive side, efforts toward more efficient operations, improved inventory control, and better staffing patterns were cited most often. On the negative side, postponement of capital expenditures for old and outdated equipment and failure to evaluate and set up new procedures has been reported to be most detrimental. About fifty percent responded that quality of service had not been affected, while the remaining fifty percent believed that quality had suffered in varying degrees (pp. 38-39).

Another study reported an attempt by the New York City Department of Health to restructure fundamentally the city's clinical laboratory industry by centralizing testing in each of the city's five boroughs. The plan was to request competitive bidding by laboratories for the Medicaid outpatients in the five areas of New York. The plan was plagued by a great deal of controversy from the state medical society, the state pathology society, independent laboratory owners, and the former U.S. Department of Health, Education, and Welfare. The overall cost saving of the program appeared to be feasible, but there was too much organized opposition to the proposed plan to allow it to become viable. However, the Federal Court requested the then U.S. Department of Health, Education, and Welfare to implement a pilot program in the Borough of Queens to demonstrate the operational feasibility of a centralized system and its impact on recipients and providers of laboratory services (Paris 1976:777-793).

Financial Management

Sound financial management has become a major factor in the operation of all health care facilities. The financial feasibility of an operation can be determined only by the analysis of financial data, current and projected. The microeconomics of shared services can also be addressed and analyzed through the application of accepted accounting

principles and the achievement of sound financial operations. Financial management as it relates to microeconomics will be discussed in terms of conditions to be met, financial tools and techniques which can be used, and the analysis of data collected.

Conditions

Christy and Roden (1976:182) referred to the "three A's" of financial management which they indicated that every financial manager must address. The "three A's" were (1) anticipate financial need, (2) acquire financial resources, and (3) allocate funds in the business. Effective financial management is essential for the success of any business, but it is not the only condition which must be met. Profits do not occur by accident, but instead must be planned in advance. Profits are the result of hard work, foresight, ambition, and determination (p. 183).

A manager is in a position to anticipate financial needs by forecasting expected events and noting their financial implications. Documents which are prepared when a company is forecasting are: (1) a cash budget, (2) an income statement, (3) a balance sheet, (4) a statement of sources and uses of funds, (5) a capital expenditure budget, and (6) an operating budget (Christy and Roden 1976:185).

Acquiring resources necessitates the manager's knowing when, where, and how to procure funds for operation. It includes knowing providers of funds, timely requests for funds, and substantial facts and figures to justify the request (Christy and Roden 1976:186). The manager must also be able to determine whether short-term or long-term financing better covers the situation (p. 187).

Allocating funds indicates utilizing them in an optimal equilization of assets. Assets are optimized by weighing their profitability (earning power) against their liquidity (closeness to money). This optimizing of assets is a delicate balance for the financial manager to maintain (Christy and Roden 1976:187). The measurement of a company's financial position is described in terms of profitability and liquidity. These terms identify how much a business is making for its owners and how able it is to pay its bills (p. 222).

According to Berman and Weeks (1976:1), financial management traditionally has not been a part of operational management. However, the role is changing, and financial managers are becoming an integral component of operational management. The primary objective of management in a commercial enterprise is to maximize the owner's profits. Thus, management's goal is to find the right combination of earnings and capitalization rate to increase the owner's wealth (p. 2).

Tools and Techniques

Financial management tools and techniques assist management in providing the community with quality services at the least cost by furnishing the data which are pertinent to making good capital investment decisions. Additionally, financial management tools such as cost finding reports, expense and revenue budgets, and position and operating statements provide management with data necessary to control internal operation. Cost finding reveals information on actual operational performance which can be compared to budgeted expectations. These data in conjunction with position and operating statements provide management with the necessary information to evaluate and control capital structure. Cost finding can also be used to set equitable fee schedules in order to provide a proper revenue-expense ratio to ensure profitability (Berman and Weeks 1976:3-5).

Financial planning is the process of establishing programs for the achievement of fiscal objectives. A knowledge and understanding of historical and projected data are the basis upon which sound financial planning should be established. These adequate accounting records establish a foundation upon which management can make sound judgements about the future of a facility or project (Seawell 1975:16).

Responsibility accounting, recommended for hospitals, can be applied to other health care organizations. Each

organizational unit in this system forms a responsibility center, and is charged with all expenses for which it is responsible and is credited with all revenues which it generates. This system of accounting provides historical data that serve as a basis for effective budgeting and for making future projections (Seawell 1975:138).

Other appropriate data are also necessary for planning (Seawell 1975:139). The availability of reliable non-monetary data relating to volume and scope of services in previous periods are important to the budgeting process. Expected levels of activity are projected, based on previous history, and are used in the planning and control phases of budgeting and long-range planning.

Periodic accounting and statistical reports show how well an organization adheres to management's financial plans and objectives. Budgeting, internal control, cost finding, and financial analysis serve as a means of evaluating the performance of an organization. Additionally, these data serve as a basis for control decisions and the evaluation of the results of those decisions (Seawell 1975:16).

Financial control, according to Seawell (1975:16), is the process by which management assures conformity of the operating results of organizational units, with its plans and policies to achieve its objectives. The main objective

of financial control is the determination of optimum operating results and financial position and the direction of activities to achieve those goals.

The purpose of a commercial business is to make a profit. The business is owned by either a sole proprietor or partners or a group of corporate stockholders. Whatever the type of ownership, a satisfactory return on the original investment in a reasonable period of time is a major consideration. The standard of success in business is measured usually by the amount of net income in relation to the capital invested in the business. In the health care industry, the standard of success is the extent to which an organization can serve the needs of the community while maintaining quality care at a reasonable cost (Seawell 1975:17).

When a business is acquired by another company, the purchase is treated as an investment by the buyer. The price paid in excess of the net worth is reflected as "goodwill." Goodwill is ordinarily debited against future income. The goodwill is amortized over a period of its estimated life as is any other asset. Goodwill is not deductible for tax purposes and therefore, reduces possible future earnings (Horne 1971:592).

Analysis

Financial statements provide vital information concerning the position of a business and the results of its

operations. Analysis of the data revealed on a financial statement is necessary in reaching conclusions about the business and its activities. The nature of the analysis depends upon the questions which have been raised. Three major such analytical questions concern: (1) solvency, (2) stability, and (3) profitability (Simons and Karrenbrock 1964:771).

A corporation, to be solvent, must be in a position to meet its liabilities. Statements are analyzed to ascertain whether the business is solvent and whether it can retain its solvency if it should have a period of adversity (Simons and Karrenbrock 1964:771).

Stability, as discussed by Simons and Karrenbrock (1964:772), is measured by the ability of a company to meet interest and principle payment requirements against outstanding debts and its ability to pay dividends to its stockholders regularly. Stability is determined from data concerning the operations such as volume of activity and the financial position of the company. It is important that there be a regular demand for goods or services being sold, and the margin on sales must be sufficient to cover operating expenses, interest, and dividends.

Profit is defined as a dollar amount or the figure at the bottom of the income statement (Christy and Roden 1976:225). Profitability is defined as the ratio of capital

gain to the amount of capital invested (p. 225). Profitability can be expressed in terms of profit before taxes and interest or profit after taxes and interest. Either use is acceptable as long as the individual using the ratio is aware of which relationship is being expressed (p. 227). Profitability is measured by the success of a business in maintaining and increasing the owner's equity (Simon and Karrenbrock 1964:772). The nature and the amount of revenues as well as their regularity and trend are all significant factors in determining profitability.

Summary and Conclusions

Shared services, mergers, antitrust regulations, costs, and financial management have been the topics reviewed in this chapter. This restatement traces the chronological development of the regional reference laboratory from its inception to its present status in relation to the topics reviewed. Microeconomics, the theoretical foundation for the study, also will be discussed, as well as the key concepts which enter into the analysis of the study. Literature support for the problem and other aspects of study design also are concluded. These considerations are presented as follows.

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History

The regional reference laboratory of present reference has been traced in its history from the early concerns of the corporation to improve quality and reduce costs for its hospitals, through the mechanisms for establishing and operating the laboratory, to the deliberations on the financial feasibility of the project. A discussion of each step follows.

The preliminary approach taken by the hospital management corporation was the consideration of establishing a new organizational structure to address the issues of quality and cost. The restructuring of an organization is governed by past experiences, future trends, and objectives to be met and alluded to by Georgopoulos (1972:2-5). The experience of the present corporation was that each of its hospitals was spending several thousand dollars per month on reference laboratory work. The increased demands for testing and the costs involved indicated a trend toward more dollars being spent in the future. The objectives, therefore, were to establish a regional reference laboratory to satisfy the needs of the hospitals in the area and to contain costs.

The corporation determined that a regional reference laboratory would enable its member hospitals to share reference services. There was evidence in the literature

that data were being collected to document perceived advantages of multi-institutional trends, but much of it has not yet begun to appear in the literature (Wegmiller 1980:147). The literature indicated, however, that shared services among hospitals were increasing, and that more research was necessary (pp. 147-149; Astolfi and Matti 1972:61-65). The present consideration for a shared reference laboratory, therefore, was in the mainstream of the state of health care management practice.

The regional reference laboratory of present reference was established in response to the pressures imposed on hospitals to improve services and reduce costs. It was organized as a for-profit corporation similar to that which was suggested by Fritschen (1978:22-37). The incentive for the hospitals to participate was to keep the thousands of dollars spent on reference laboratory work in the company rather than payment to others. The major advantages which have resulted are: (1) the hospitals all have equal access to needed reference services and (2) the cost to the corporation to provide reference services is less because there is not duplication of equipment, supplies, and manpower in each hospital. Such gains are in keeping with the purposes, organizational scheme, and rationale of Fritschen.

Two case histories support the study design and methods concerning the present regional reference laboratory in that

both experienced an improved quality of service at a reduced cost (Frazer 1980:89-104; Townsend and Lucas 1979:107-112). Other empirical literature revealed that the same demands for improved service and cost containment had prompted both projects to be undertaken. In each case there were problems encountered; however, after a reasonable period of adjustment, each concluded that their operation was more effective and efficient than before the shared services approach was undertaken.

The regional reference laboratory in this study has revealed some of the same advantages and disadvantages as those cited in the empirical literature (Frazer 1980:89-104; Townsend and Lucas 1979:107-112). Group purchasing, minimum duplication of space, equipment, and manpower, increased availability of service, and broadened availability of professional expertise have been positive indications for continuence of the shared service concept.

The regional reference laboratory of present study became operational initially with the purchase of an existing laboratory by the hospital management corporation. The corporation is a large, multi-institutional system. Literature from the seventies predicted the growth of multi-institutional systems to provide a better quality of care for a more reasonable cost (Starkweather 1970:4-6; Sieverts and Sigmond 1970:261-262; Olson 1979:141; Zuckerman 1979:3-12;

Platou and Rice 1974:15-24). The merger of the present reference laboratory with the hospital management corporation was a vertical merger (Thompson 1979:72) which provided a new dimension to the corporation's health care program, and is in keeping with the predicted growth of multi-institutional systems.

A corporate merger raises the question of possible violation of antitrust statutes (Thompson 1979:70-73). In this instance the merger of corporations did not "substantially lessen competition." The stock in the laboratory was bought by the hospital management corporation as an investment, and was not purchased to be used to limit competition (cf. Horne 1971:592). In the area where the reference laboratory is located, there are more than one hundred hospitals. The laboratory was established to serve the nine hospitals owned or managed by the corporation and therefore, did not have any real impact on the larger market of concern in antitrust stipulations. Thus, while trust prohibitions are an appropriate consideration for merger activity, it is reasoned that such regulations do not apply to the present merger.

The role that costs have played in shared services was the major implication for exploring shared services. The literature revealed that increased demands for improved quality of care, advances in new technology, and regulations

governing reimbursement (Sorkin 1975:10; Brecher 1978:615-616; Phillips and Hai 1979:47; Wertman et al. 1980:2080-2082; Gallwas 1980:86-90; Roth 1979:97-98; Johnson 1980:55-61) have dramatically increased the cost of health care. The corporation found this increase in costs to be true with reference laboratory testing. Thus, the decision to investigate shared services in the form of regional laboratories, is consistent with the state of health care administration as regards this type of activity.

The financial management of the present regional reference laboratory has been a major factor in determining the financial feasibility of the project. The corporation has policies and procedures for administrators of its subsidiaries to follow as regards financial management. The conditions (cf. Christy and Roden 1976:182-186), the tools and techniques (cf. Berman and Weeks 1976:3-5; Seawell 1975:16-17, 138-139; Horne 1975:592), and the analysis (cf. Simons and Karrenbrock 1964:771-772) of financial management in the literature supported such policies and procedures of the corporation, and are the methods of this thesis.

Microeconomics

The microeconomics theoretical basis for this study of shared services brought into focus certain issues. As discussed below, these issues affect in the present case test volume, new technology, and reimbursement of costs.

Perna (1980) indicated that there has been a steady increase in the amount of reference laboratory work generated over the past few years, and that there has been indication that the trend will continue. Volume-sensitive economics and advances in new technology, according to Perna (1980), were major contributors to the growth of the reference laboratory industry. Reference laboratories, because of high volumes, can provide laboratory tests at approximately one-third the fee that a hospital must charge (Johnson 1980:55-59). Advances in new technology have turned laboratory testing from procedures performed strictly for diagnosis to a broader testing base for the monitoring of therapy (Wertman et al. 1980:2080-2082). Gallwas (1980:87-90) suggested that new technology could reduce health care costs by increasing productivity. He also suggested that new technology should be introduced only when its benefits to the patient outweigh its cost. Thus, the regional reference laboratory in this study provides its clients with needed services for less cost.

The literature pointed to reimbursement regulations as another factor causing an increase in reference laboratory testing. The two major regulations having the most influence are (1) reimbursement of cost for laboratory tests based on the lowest cost in the area and (2) elimination of payment for routine admission profiles (Johnson 1980:55-59).

Not all writers, however, concluded that a regional reference laboratory was the answer to the problem of reimbursement. Roth (1979:97-98) suggested lowering the cost per test for hospital tests and adding separate charges for personnel and supplies for procurement and processing of tests as another alternative. For the purposes of this study, however, the hospital management corporation chose to provide service as inexpensively as was feasible.

Cost-benefit versus cost effective analysis is another aspect of the microeconomics of shared service which was brought out in the literature. The health care industry especially is concerned with this problem of cost containment (Gallwas 1980:87-90; Perna 1980; Johnson 1980:61-65). In keeping with this sense of the literature, the present hospital management corporation mandated that the regional reference laboratory must attain and hold a cost effective status in order to be a viable entity. Therefore, this study was aligned with the primary economic views of the corporation on cost containment.

The microeconomics of shared service has implications as regards the regionalization of reference laboratory work in that the volume is increasing as a result of changing economics and new technology (Perna 1980). There are many points and concerns to be considered in order for the regional reference laboratory to satisfy the needs of the hospitals

and the corporation. Thus, the present study is closely associated with the microeconomics of shared services.

Analytical Concepts

The key considerations entering into the analysis of this study were: (1) that the computations from the monthly operating reports could be averaged to provide a basis for further financial analysis, (2) that the pretax, preinterest income for 1981 to 1985 could be extrapolated from the empirical data collected, and (3) that the profitability of the regional reference laboratory could be determined by computing the percent rate of return on the original investment and the pay back period. These concepts were substantiated in the literature as related to financial management and are discussed as follows.

Anticipation of financial needs, acquisition of funds, and allocation of funds were the major conditions which were considered in determining the financial management of the organization (Christy and Roden 1976:182-183). Anticipation of financial needs involves the preparation of budgets, balance sheets, and income statements (p. 185). Therefore, in planning for the financial needs of the present regional laboratory, budgets including cash flow, operating, and capital expenditure were prepared in advance of the actual beginning operations of the laboratory. New budgets were

also prepared before the beginning of the 1980 fiscal year. Balance sheets were prepared periodically, and the monthly and quarterly operating statements were the income statements which were prepared. Acquisition of operating funds came from the corporation in the form of intercompany loans and from revenues generated from increases in business. Allocation of funds was determined primarily by the absence of a profit through May, 1980. Thus, the present regional laboratory was established and operated according to accepted procedures in financial management.

The monthly operating statements were a major source of data used to evaluate and control the laboratory operation. Financial management tools such as cost finding reports, expense and revenue budgets, and operating statements provided management with the data necessary to control internal operations as suggested by Berman and Weeks (1976:3-5). Further, operating information was compared to budgeted expectations to determine the financial progress of the laboratory.

Financial planning for the laboratory of present reference for 1981 to 1985 was based on historical data and projections from the operating statements. This method was in keeping with Seawell (1975:16), who indicated that adequate accounting records establish a foundation upon which management can make sound judgements about the future of a project.

Seawell also indicated that the periodic accounting and statistical reports show how well an organization adheres to management's financial plans and objectives. Given the accumulation of historical data from the operating statements, projections were made about the financial future of the present reference laboratory.

A satisfactory return on the original investment in a reasonable time period was one condition the laboratory had to address in order to continue operations. As Seawell (1975:17) expressed, the standard of success of a business is usually measured by the amount of net income in relation to the capital invested. For the present hospital management corporation to consider the reference laboratory financially feasible, the percent rate of return on the original investment had to be a minimum of 12.5 percent, and the pay back period could not exceed 4.5 years. Further, the present laboratory as projected should meet these criteria.

Analysis of financial statements provide vital information concerning the position and operations of a business (Simons and Karrenbrock 1964:771-772). Any final decisions regarding the future of managerial operation should consider solvency, stability, and profitability (p. 772). These are significant considerations in judging the financial feasibility of any project. The present reference laboratory would be determined financially feasible if it proved to be solvent,

stable, and profitable according to accepted financial management procedures.

Conclusion

The major issues relating to this body of literature were the regionalization of laboratory services and the microeconomics involved. The present problem, which is the financial feasibility of the regional reference laboratory, is in the mainstream of managerial research as it relates to the analysis of data for financial management purposes.

The state of the art in research design for regional laboratory service is that of the case study. Two such studies were begun in an effort to improve service and contain cost, much as the present study was initiated. The outcome of the studies were achievement of these primary objectives (cf. Frazer 1980:89-104; Townsend and Lucas 1979: 107-112) and suggested similar results could be anticipated in the present case.

Methods appropriate to the findings and analysis of the financial feasibility of the regional reference laboratory were supposed by the literature as it related to the tools and techniques used to measure financial success (cf. Berman and Weeks 1976:3-5; Seawell 1975:16-17, 138-139; Horne 1971:592; Simons and Karrenbrock 1964:771-772). The

instruments used for the collection of data in this study (operating statements; pretax, preinterest income projections; and profitability indexes worksheet) were all in accord with accepted financial management practices as was evidenced in the literature. These instruments were, therefore, satisfiable and hold validity in the hospital management corporation.

The assumption that the data collected for nine months would indicate a trend upon which projections could be established, and that the analysis requested by the corporation would enable the writer to determine financial feasibility were supported by the literature. These assumptions were evidenced by the following: (1) financial planning was established on a knowledge of historical and projected financial data (cf. Seawell 1975:138), and (2) the analysis of financial data was computed to reach conclusions about a business and its activities (cf. Simons and Karrenbrock 1964:771). Thus, the assumptions in keeping with literature standards were made in regard to the present study.

The literature reviewed supported and substantiated the use of those key concepts which entered into the analysis of the present study as was evidenced in the preceding narrative. The investigator believes that the study problem, design, and methods have been justified sufficiently by the literature findings and are those of the case study

method, the state of the art for such business considerations. Given that laboratory shared service through regionalization is a viable alternative to a more costly means of providing laboratory reference service, regionalization involves careful planning and implementation to achieve the objectives of quality service and cost containment, the thoughtful analysis of which sets the tone for the present study.

CHAPTER IV

FINDINGS

Introduction

The hospital management corporation of present reference established a regional reference laboratory to provide reference laboratory services at reduced costs to its corporation-owned hospitals. Certain data were collected and analyzed to determine the financial feasibility of regionalizing such a laboratory as a particular case for objectives unto itself, but in consideration of such ventures elsewhere. A discussion of the financial information collected and the treatment of it for these purposes follows.

Financial Information Collected

The financial information collected before and after this researcher became involved in the study is displayed in tables 1 through 10. Each table will be discussed in relation to the information which it contains, as follows.

A questionnaire was sent to nine, corporation-owned hospitals in late 1978 in the study region. It retrieved information which was important in determining the size of an existing laboratory to purchase, and the procedures which needed to be provided initially. Table 1 reflects the financial information gathered from questionnaire re-

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TABLE 1

HOSPITAL SIZE AND REFERENCE LABORATORY EXPENDITURES
OF CORPORATION-OWNED HOSPITALS,
JULY-DECEMBER, 1978

Hospitals Surveyed	Bed Size of Hospital	Average Annual Reference Laboratory Expenditures
A	115	\$ 6,000
B	232	55,200
C	104	60,000
D	129	84,000
E	165	67,000
F	87	18,000
G	150	6,000
H	215	88,000
I	48	6,000
Totals	1,245	\$391,200

sponses. This table reflects expenditures that could be captured as revenue, the number of accounts, the range in dollar volume, and total dollar volume expended for reference laboratory work. These data reiterated to the corporation the dollar volume per year being spent on reference laboratory work.

Revenue and expense information on the reference laboratory was collected each month from September, 1979 through May, 1980, and operating statements were prepared. This investigator chose to review nine months of operations extending from September, 1979 through May, 1980 for two reasons: (1) September was the first full month of operation after the laboratory was purchased and (2) May, 1980 had to be the cut-off date in order to have sufficient time to analyze the data collected. July, 1980 had been set by the corporation as the deadline for making a decision about the financial feasibility of the project. These operational statements compared actual revenues and expenses with budget estimates prepared before operations began. Additional revenues were being generated from clients other than the corporation-owned hospitals during this period, and were also included in the budget. It was expected that following nine months of operation, the present reference laboratory would generate an average pretax, preinterest profit of \$11,000 per month.

The September financial data are listed in table 2. These data reflect participation in the regional reference laboratory from only three of the six hospitals. The data reflected that a pretax, preinterest profit was not attained, and that an \$8,000 loss was incurred.

The data collected in October included reference laboratory work from four hospitals. Table 3 details the financial picture for the month of October. The operating statement showed a \$13,000 increase in revenue with a \$3,000 pretax profit.

November financial data reflected a \$9,000 loss (see table 4). Even though another hospital was added as a laboratory client, the total volume of work from the hospitals dropped, and the revenue was down \$9,000 from the month before (see table 3), and operating expenses increased by \$3,000. The drop in volume was attributed to a decrease in patient census among the hospital clients.

The addition of the sixth hospital in December increased the revenue from the hospitals by \$7,000 over the November revenue. The noncorporation client revenues were down \$5,000, however, and the operating expenses increased by \$5,000. The result was a loss for December of \$13,000. Table 5 displays the December financial information.

January, 1980 began a new fiscal year for the laboratory. A new budget had been prepared, based on all six

TABLE 2

SEPTEMBER OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORYCode XYZ Month Sept. 30 Fiscal 1979
Is IN THOUSANDS:

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE*		ACTUAL	BUDGET	VARIANCE*
18	38	(20)	Patient Revenue*	18	38	(20)
12	17	(5)	Inpatient	12	17	(5)
30	55	(25)	Outpatient	30	55	(25)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Seill.			
			Medicare			
			Medicaid			
			Other			
1	1	—	Provision for Doubt. Acct.	1	1	—
1	1	—	Courtesy Discounts	1	1	—
			Total Deductions from Revenue			
29	54	(25)	Net Patient Revenue	29	54	(25)
—	—	—	Other Revenue	—	—	—
29	54	(25)	Net Revenue	29	54	(25)
10	14	(4)	Operating Expense	10	14	(4)
9	9	—	Salaries & Benefits	9	9	—
3	2	(1)	Department Supplies	3	2	(1)
9	12	3	Medical Specialist Fees	9	12	3
2	1	(1)	Contract Services	2	1	(1)
33	38	5	Other	33	38	5
			Total Operating Expenses			
(4)	16	(20)	Contribution Margin	(4)	16	(20)
0	29.6%		% Contribution Margin	0	29.6%	
1	3	2	Non Operating Expense	1	3	2
			Depreciation & Amortization			
3	3	—	Interest	3	3	—
			Rent			
			Taxes & Licenses			
4	6	2	Other	4	6	2
			Total Non Operating Expense			
(8)	11	(19)	Pre-Inter. Company Income	(8)	11	(19)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(8)	11	(19)	Pre-Tax Profit	(8)	11	(19)
	20.3%		% Pre-Tax Profit		20.3%	

Favorable (Unfavorable)

TABLE 3

OCTOBER OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORY
 Code XY2 Month Ended Oct. 31 Fiscal Year 1979
 IS IN THOUSANDS

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE*		ACTUAL	BUDGET	VARIANCE*
28	38	(10)	Patient Revenue*	46	76	(30)
15	19	(4)	Inpatient	27	36	(9)
43	57	(14)	Outpatient	73	112	(39)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Seill.			
			Medicare			
			Medicaid			
			Other			
			Provision for Dblt. Acct.	2	2	—
1	1	—	Courtesy Discounts	2	2	—
1	1	—	Total Deductions from Revenue			
42	56	(14)	Net Patient Revenue	71	110	(39)
—	—	—	Other Revenue	—	—	—
42	56	(14)	Net Revenue	71	110	(39)
			Operating Expense	25	29	4
15	15	—	Salaries & Benefits	13	18	5
4	9	5	Department Supplies	4	4	—
2	2	—	Medical Specialist Fees	19	24	5
10	12	2	Contract Services	7	2	(5)
5	1	(4)	Other	68	77	9
35	39	4	Total Operating Expenses	3	33	(30)
7	17	(10)	Contribution Margin	48	308	(268)
168	308	(148)	% Contribution Margin			
			Non Operating Expense	2	6	4
1	3	2	Depreciation & Amortization	6	6	—
3	3	—	Interest			
			Rent			
			Taxes & Licenses			
			Other	8	12	4
4	6	2	Total Non Operating Expense	(5)	23	(28)
3	11	(3)	Pre-Inter. Company Income			
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
3	11	(8)	Pre-Tax Profit	(5)	23	(28)
	19.6%		% Pre-Tax Profit		20.9%	

Favorable (Unfavorable)

TABLE 4

NOVEMBER OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORY
 Code XYZ Month Nov. 30 Fiscal 1979
 Ended Year
 IS IN THOUSANDS

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
19	38	(19)	Patient Revenue*	65	114	(49)
16	19	(3)	Inpatient	43	55	(12)
35	57	(22)	Outpatient	108	169	(61)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Settl.			
			Medicare			
			Medicaid			
			Other			
2			Provision for Doubt Acct.	4	2	(2)
2			Courtesy Discounts	4	2	(2)
			Total Deductions from Revenue			
33	57	(24)	Net Patient Revenue	104	167	(63)
			Other Revenue			
33	57	(24)	Net Revenue	104	167	(63)
18	15	-(3)	Operating Expense	43	44	1
6	9	3	Salaries & Benefits	19	27	8
2	2	—	Department Supplies	6	6	—
13	13	—	Medical Specialist Fees	32	37	5
(1)	1	1	Contract Services	6	3	(3)
38	40	2	Other	106	117	11
			Total Operating Expenses			
(5)	17	(22)	Contribution Margin	(2)	50	(52)
	29.8%	—	% Contribution Margin		30%	
1	3	2	Non Operating Expense	3	9	6
			Depreciation & Amortization			
3	3	—	Interest	9	9	—
			Rent			
			Taxes & Licenses			
4	6	2	Other	12	18	6
			Total Non Operating Expense			
(9)	11	(20)	Pre-Inter Company Income	(14)	32	(46)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(9)	11	(20)	Pre-Tax Profit	(14)	32	(46)
	19.3%		% Pre-Tax Profit		19.2%	

Favorable (Unfavorable)

TABLE 5

DECEMBER OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORYCode XYZ Month Dec. 31 Fiscal 1979
Ended Year

(IS IN THOUSANDS)

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
26	38	(12)	Patient Revenue*	95	152	(57)
11	19	(8)	Inpatient	50	74	(24)
37	57	(20)	Outpatient	145	226	(81)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Sett.			
			Medicare			
			Medicaid			
			Other			
			Provision for Doubt Acct.			
1	1	—	Courtesy Discounts	5	3	(2)
1	1	—	Total Deductions from Revenue	5	3	(2)
36	56	(20)	Net Patient Revenue	140	223	(83)
—	—	—	Other Revenue	—	—	—
36	56	(20)	Net Revenue	140	223	(83)
18	15	(3)	Operating Expense	61	59	2
6	9	3	Salaries & Benefits	25	36	11
2	2	—	Department Supplies	8	8	—
16	13	(3)	Medical Specialist Fees	48	50	2
1	1	—	Contract Services	7	4	(3)
43	40	(3)	Other	149	157	8
			Total Operating Expenses			
(7)	16	(23)	Contribution Margin	(9)	6.6	(75)
—	28%	—	% Contribution Margin		29.6%	
2	3	1	Non Operating Expense	5	12	7
			Depreciation & Amortization	—	—	—
3	3	—	Interest	12	12	—
1	—	—	Rent	1	0	(1)
—	—	—	Taxes & Licenses	—	—	—
6	6	—	Other	18	24	6
			Total Non Operating Expense			
(13)	10	(23)	Pre-Inter Company Income	(27)	42	(69)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(13)	10	(23)	Pre-Tax Profit	(27)	42	(69)
	17.8%		% Pre-Tax Profit		18.8%	

Favorable (Unfavorable)

hospitals participating with the pilot regional laboratory. Also budgeted was a 50 percent increase in noncorporation client revenues. Table 6 reveals that the hospital revenues were \$5,000 over budget, but the noncorporation client revenues were \$20,000 under budget. The increase in volume with resultant increase in revenue also necessitated an increase in operating expenses. The profit lost in January was \$6,000.

Table 7 reflects that February's financial information was very similar to January's. The major difference occurred in the operating expenses, which decreased from January, but remained \$2,000 over budget. The loss of profit in February was \$3,000.

The operating statement for March reflected a loss of \$6,000 in profits. Noncorporation client revenue was \$21,000 under budget and operating expenses increased by \$10,000 (see table 8).

The operating statement for April revealed a loss in profit of \$3,000, as shown in table 9. The major contributing factors to this loss were the low noncorporation client revenue and operating expenses which were increased \$9,000 over that which was budgeted.

The financial data generated for May were similar to those for the previous months in that the noncorporation client revenue was low and the total operating expenses were

TABLE 6

JANUARY OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORY
 Code XYZ Month Jan. 31 Fiscal 1980
 Ended Year
 IS IN THOUSANDS

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
40	35	5	Patient Revenue	40	35	5
15	35	(20)	Inpatient	15	35	(20)
55	70	(15)	Outpatient	55	70	(15)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj YE Settl.			
			Medicare			
			Medicaid			
			Other			
1	5	4	Provision for Doubt Acct.	1	5	4
1	5	4	Courtesy Discounts	1	5	4
			Total Deductions from Revenue			
54	65	(11)	Net Patient Revenue	54	65	(11)
—			Other Revenue	—	—	—
54	65	(11)	Net Revenue	54	65	(11)
			Operating Expense			
18	19	1	Salaries & Benefits	18	19	1
13	11	(2)	Department Supplies	13	11	(2)
2	2	—	Medical Specialist Fees	2	2	—
22	14	(8)	Contract Services	22	14	(8)
1	1	—	Other	1	1	—
56	47	(9)	Total Operating Expenses	56	47	(9)
(2)	18	(20)	Contribution Margin	(2)	18	(20)
—	27.6%		% Contribution Margin		27.6%	
2	2	—	Non Operating Expense	2	2	—
—			Depreciation & Amortization	—		
2	2	—	Interest	2	2	—
—			Rent	—		
—			Taxes & Licenses	—		
4	4	—	Other	4	4	—
(6)	14	(20)	Total Non Operating Expense	(6)	14	(20)
			Pre-Inter Company Income			
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(6)	14	(20)	Pre-Tax Profit	(6)	14	(20)
	21.5%		% Pre-Tax Profit		21.5%	

Favorable (Unfavorable)

TABLE 7

FEBRUARY OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORY
 Code XYZ Month Feb. 29 Fiscal 1980
 Ended Year
 IS IN THOUSANDS

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
39	35	4	Patient Revenue	79	70	9
13	35	(22)	Inpatient	28	70	(42)
52	70	(18)	Outpatient	107	140	(33)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj YE Sett.			
			Medicare			
			Medicaid			
			Other			
1	5	4	Provision for Doubt Acc.	2	10	8
1	5	4	Courtesy Discounts	2	10	8
			Total Deductions from Revenue			
51	65	(14)	Net Patient Revenue	105	130	(25)
—	—	—	Other Revenue	—	—	—
51	65	(14)	Net Revenue	105	130	(25)
			Operating Expense	35	38	3
17	19	2	Salaries & Benefits	23	22	(1)
10	11	1	Department Supplies	4	4	—
2	2	—	Medical Specialist Fees	42	28	(14)
20	14	(6)	Contract Services	2	2	—
1	1	—	Other	106	94	(12)
50	47	(3)	Total Operating Expenses	(1)	36	(37)
1	18	(17)	Contribution Margin		27.6%	
2.0	27.6	26%	% Contribution Margin			
			Non Operating Expense	4	4	—
2	2	—	Depreciation & Amortization	—	—	—
—	—	—	Interest	4	4	—
2	2	—	Rent	—	—	—
—	—	—	Taxes & Licenses	—	—	—
—	—	—	Other	8	8	—
4	4	—	Total Non Operating Expense	(9)	28	(37)
(3)	14	(17)	Pre-Inter Company Income			
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(3)	14	(17)	Pre-Tax Profit	(9)	28	(37)
	21.5%		% Pre-Tax Profit		21.5%	

Favorable (Unfavorable)

TABLE 8

MARCH OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORYCode XYZ Month Mar. 31 Fiscal 1980
Ended Year
(IS IN THOUSANDS)

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
42	35	7	Patient Revenue*	121	105	16
14	35	(21)	Inpatient	42	105	(63)
56	70	(14)	Outpatient	163	210	(47)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Sett.			
			Medicare			
			Medicaid			
			Other			
			Provision for Doubt Acct.			
2	5	3	Courtesy Discounts	4	15	11
2	5	3	Total Deductions from Revenue	4	15	11
54	65	(11)	Net Patient Revenue	159	195	(36)
			Other Revenue			
54	65	(11)	Net Revenue	159	195	(36)
			Operating Expense			
19	19	—	Salaries & Benefits	54	57	3
13	11	(2)	Department Supplies	36	33	(3)
2	2	—	Medical Specialist Fees	6	6	—
22	14	(8)	Contract Services	64	42	(22)
1	1	—	Other	3	3	—
57	47	(10)	Total Operating Expenses	163	141	(22)
(3)	18	(21)	Contribution Margin	(4)	54	(58)
—	27.6%	—	% Contribution Margin	—	27.6%	—
			Non Operating Expense			
1	2	1	Depreciation & Amortization	5	6	1
2	2	—	Interest	6	6	—
			Rent			
			Taxes & Licenses			
			Other			
3	4	1	Total Non Operating Expense	11	12	1
(6)	14	(21)	Pre-Inter Company Income	(15)	42	(57)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(6)	14	(21)	Pre-Tax Profit	(15)	42	(57)
—	21.5%	—	% Pre-Tax Profit	—	21.5%	—

Favorable (Unfavorable)

TABLE 9

APRIL OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORYCode XYZ Month Ap. 30 Fiscal 1980
Ended Year

IS IN THOUSANDS:

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
42	35	7	Patient Revenue	163	140	23
15	35	(20)	Inpatient	57	140	(83)
57	70	(13)	Outpatient	220	280	(60)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Sett.			
			Medicare			
			Medicaid			
			Other			
1	5	4	Provision for Doubt Acct.	5	20	15
1	5	4	Courtesy Discounts	5	20	15
			Total Deductions from Revenue			
56	65	(10)	Net Patient Revenue	215	260	(45)
—	—	—	Other Revenue	—	—	—
56	65	(10)	Net Revenue	215	260	(45)
			Operating Expense			
20	19	1	Salaries & Benefits	74	76	2
11	11	—	Department Supplies	47	44	(3)
2	2	—	Medical Specialist Fees	8	8	—
21	14	(7)	Contract Services	85	56	(29)
2	1	(1)	Other	5	4	(1)
56	47	(9)	Total Operating Expenses	219	188	(31)
0	18	(18)	Contribution Margin	(4)	72	(76)
—	27.6%	—	% Contribution Margin	—	27.6%	—
			Non Operating Expense			
1	2	1	Depreciation & Amortization	6	8	2
—	—	—	Interest	—	—	—
2	2	—	Rent	8	8	—
—	—	—	Taxes & Licenses	—	—	—
—	—	—	Other	—	—	—
3	4	1	Total Non Operating Expense	14	16	2
(3)	14	(17)	Pre-Inter Company Income	(18)	56	(74)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(3)	14	(17)	Pre-Tax Profit	(18)	56	(74)
—	21.5%	—	% Pre-Tax Profit	—	21.5%	—

Favorable (Unfavorable)

high. Table 10 shows the operating statement for May. The loss of profit was \$8,000.

The total loss for 1979 was \$27,000, which represented only four months of operation (September through December). The 1980 year-to-date loss of profit at May was \$26,000. Therefore, after operating for nine months, the regional laboratory had experienced a loss of profit totaling \$43,000.

Treatment of Information

The financial information presented in the section above provided the basis in empirical data for data extrapolations and projections of pretax, preinterest income for 1981 through 1985. Test volumes in College of American Pathology workload units (Workload Recording Committee 1980) were also computed and extrapolated for use in the 1981-1985 analysis. The analysis was then used to calculate the profitability indexes of the regional reference laboratory in order to determine its financial feasibility. The indexes calculated were the percent rate of return on the original investment and the pay back period. The treatment of this information is considered as follows.

The information shown on table 11 depicts the monthly workload units, the cost per unit, and the revenue per unit for September, 1979 to May, 1980. The workload unit represents the weighted volume or activity of work performed

TABLE 10

MAY OPERATING STATEMENT

COMPARISON TO FIXED BUDGET

Hospital REGIONAL REFERENCE LABORATORY
 Code XYZ Month May 31 Fiscal 1980
 Ended Year
 IS IN THOUSANDS:

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE*		ACTUAL	BUDGET	VARIANCE*
37	35	2	Patient Revenue*	200	175	25
14	35	(21)	Inpatient	71	175	(104)
51	70	(19)	Outpatient	271	350	(79)
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Settl.			
			Medicare			
			Medicaid			
			Other			
			Provision for Doubt. Acct.			
1	5	4	Courtesy Discounts	6	25	19
1	5	4	Total Deductions from Revenue	6	25	19
50	65	(15)	Net Patient Revenue	265	325	(60)
			Other Revenue			
50	65	(15)	Net Revenue	265	325	(60)
			Operating Expense	92	95	3
18	19	1	Salaries & Benefits	61	55	(6)
14	11	(3)	Department Supplies	10	10	
2	2		Medical Specialist Fees	105	70	(35)
20	14	(6)	Contract Services	6	5	(1)
1	1		Other	274	235	(39)
55	47	(8)	Total Operating Expenses			
(5)	18	(23)	Contribution Margin	(9)	90	(99)
	27.6		% Contribution Margin		27.6	
			Non Operating Expense	7	10	3
1	2	1	Depreciation & Amortization			
			Interest	10	10	
2	2		Rent			
			Taxes & Licenses			
			Other	17	20	3
3	4	1	Total Non Operating Expense			
(8)	14	(23)	Pre-Inter Company Income	(26)	70	(101)
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
(8)	14	(22)	Pre-Tax Profit	(26)	70	(101)
	21.5%		% Pre-Tax Profit		21.5%	

Favorable (Unfavorable)

TABLE 11

WORK UNITS, COST, AND REVENUE,
REGIONAL REFERENCE LABORATORY,
SEPTEMBER, 1979-MAY, 1980

Periods	Work Units	Cost/Unit	Revenue/Unit
September, 1979	63,600	\$.51	\$.47
October, 1979	85,877	.41	.50
November, 1979	74,231	.51	.47
December, 1979	76,359	.56	.48
January, 1980	104,619	.53	.52
February, 1980	112,311	.45	.45
March, 1980	118,820	.48	.47
April, 1980	119,888	.47	.48
May, 1980	117,354	.47	.43
Averages	111,917	.49	.48

in the laboratory. The cost per unit represents the total operating cost for each unit of work. Similarly, the revenue per unit is representative of the gross revenue generated by each unit of work. Budget projections can be extrapolated from these three known factors.

Extrapolation and expansion of the data shown in table 11 establishes a basis in empirical data for projections of activity, expenses, and revenue for future operations. The total cost per unit is subdivided into a cost per unit for each operating expense, such as salaries and benefits, supplies, contract services, and "other" for purposes of budgeting and projecting future income. Each line item of operating expenses was calculated in relation to cost per unit, based on historical data which were extrapolated from the monthly operating statements. Table 12 displays the cost factors with a 10 percent increase per year. Additionally, table 12 reflects the projected activity per year with a 10 percent annual increase and the man-hours necessary to meet those activity levels. Man-hours per unit, shown in table 12, are a constant based on previous history. This constant was used in calculating total man-hours per year. Man-hour calculations were used for determining the number of full-time-equivalent employees needed, thus affecting the salaries and benefits.

TABLE 12

BASES IN MAN-HOURS AND WORK UNITS FOR, AND COST FACTORS
 REFLECTING 10 PERCENT ANNUAL INCREASE,
 REGIONAL REFERENCE LABORATORY
 1981-1985

Year	1981	1982	1983	1984	1985
Factors					
Activity in work units	1,483,542	1,631,896	1,795,085	1,974,593	2,172,052
Man-hours per unit	.0219	.0219	.0219	.0219	.0219
Total paid man-hours	32,489	35,738	39,312	43,244	47,568
Salaries/benefits per unit	\$.170	\$.187	\$.206	\$.277	\$.250
Supplies per unit	.100	.110	.120	.130	.140
Contract services per unit	.180	.200	.220	.240	.260
Other per unit	.016	.018	.020	.022	.024
Gross revenue per unit	.530	.580	.640	.950	.770

The pretax, preinterest income was calculated for 1981 to 1985 by extrapolating the data from table 12. The deductions from gross revenue to yield net revenue were based on the past nine month's history of the laboratory. The same was true for the nonoperating expenses. Additional physical space and capital expenditures for equipment were also added to the nonoperating calculations. This pretax, preinterest income analysis is shown in table 13.

The profitability indexes were computed after calculating the pretax, preinterest income for 1981 to 1985. The calculations are shown in table 14. The percent rate of return on the original investment was 29.9 percent with a pretax pay back period of 4.3 years.

Summary

Data were collected and analyzed from the study for the purpose of determining the financial feasibility of a regional reference laboratory. A summary of the financial information collected and analyzed follows.

The data gathered by the questionnaire from the nine corporation-owned hospitals indicated that \$391,200 were expended in 1978 for reference laboratory services. The corporation believed these expenditures could become gross revenue for the regional reference laboratory.

The operating statements for September, 1979 to May, 1980 reflected a total loss of \$43,000. As the gross re-

TABLE 13

PRETAX, PREINTEREST INCOME ANALYSIS, 1981-1985
REGIONAL REFERENCE LABORATORY
(\$ IN THOUSANDS)

Factors \ Year	1981	1982	1983	1984	1985
GROSS REVENUE	\$ 786.3	\$ 946.4	\$1149.4	\$1382.2	\$1672.5
DEDUCTIONS					
Contract Adjustments	0.0	0.0	0.0	0.0	0.0
Bad Debts	3.0	5.0	7.0	9.0	11.0
Other	12.0	14.0	16.0	18.0	20.0
Total	15.0	19.0	23.0	27.0	31.0
NET REVENUE	771.3	927.5	1126.4	1355.2	1641.5
OPERATING EXPENSES					
Salaries-Benefits	252.2	305.2	369.8	448.2	543.0
Supplies	148.4	179.5	215.4	256.7	305.1
Medical Specialist Fee*	24.0	24.0	24.0	24.0	24.0
Contract Services	267.0	326.4	394.9	473.9	564.7
Other	24.0	29.4	35.9	43.4	52.1
Total	715.6	864.5	1040.0	1246.2	1487.9
CONTRIBUTION MARGIN	55.7	63.0	86.4	109.0	153.6
NONOPERATING EXPENSES					
Depreciation	12.0	12.0	12.0	24.0	24.0
(Straight line)					
Other	36.0	36.0	36.0	48.0	48.0
Total	48.0	48.0	48.0	72.0	72.0
PRETAX, PREINTEREST INCOME	7.7	15.0	38.4	37.0	81.6

SOURCE: Cf. XYZ Hospital Management Corporation.
Controller's Manual. USA: XYZ Hospital Management Corporation, 1978.

NOTE: The information contained herewith was compiled from the study.

* Medical Specialist Fee was preset by contract.

TABLE 14

PROFITABILITY INDEXES WORKSHEET,
REGIONAL REFERENCE LABORATORY

Average Pretax, Preinterest Return on Original Investment

Pretax, Preinterest Income

1981	<u>7.7</u>			
1982	<u>15.0</u>	Average	Original	Percent
1983	<u>38.4</u>	Pretax	Investment	Return
1984	<u>37.0</u>	<u>35.9</u>	<u>120.0</u>	= <u>29.9</u>
1985	<u>81.6</u>			
Total	<u>179.7</u>			
Average	<u>35.9</u>			

Pretax, Preinterest Pay Back Period

Original Investment	<u>Annual</u>	<u>Cumulative</u>
	<u>(120.0)</u>	<u>(120.0)</u>
Pretax, Preinterest Income..... 1981	<u>7.7</u>	<u>(112.3)</u>
1982	<u>15.0</u>	<u>(97.3)</u>
1983	<u>38.4</u>	<u>(58.9)</u>
1984	<u>37.0</u>	<u>(21.9)</u>
1985	<u>81.6</u>	<u>59.7</u>

Pretax Pay Back = 4.3 years

SOURCE: Cf. XYZ Hospital Management Corporation.
Controller's Manual. USA: XYZ Hospital Management Corpora-
tion, 1978.

NOTE: The information contained herewith was compiled
from the study.

venue increased, the operating expenses also increased, leaving a deficit balance. Other data were extrapolated and expanded from the operating statements such as operating cost and gross revenue. Along with costs and revenues, the total units of activity were collected and used in the calculations of cost per unit and revenue per unit. These factors were used in calculations of the pretax, preinterest income for 1981 to 1985. Further, the pretax, preinterest income analysis was used to compute the percent rate of return on the original investment and the pay back period, which were 29.9 percent and 4.3 years, respectively.

The financial information collected and the treatment of that information were used to determine the financial feasibility of the present regional reference laboratory. The bases in empirical data for computing pretax, preinterest income were the data extracted from the monthly operating statements shown in tables 2 to 10 and the units of activity which were calculated from daily operations. The annual pretax, preinterest income projections for 1981 to 1985 (see table 13) indicated a trend toward an increasing profitability for the laboratory. The profitability indexes calculated from the income projections were a percent rate of return on the original investment of 29.9 percent and a pay back period of 4.3 years. Therefore,

the information collected in this study and analyzed by the methods approved by the corporation and supported by the literature indicate to this investigator that the present regional reference laboratory is financially feasible.

CHAPTER V

DISCUSSION

Introduction

The findings of the pilot laboratory study and the determination of the financial feasibility of the project will be discussed in relation to the literature. Alternative considerations for the continuance of the regional laboratory will be addressed as well as recommendations for further research. The writer will relate some conclusions concerning the future of regional reference laboratories and summarize the present study. These considerations follow.

Financial Feasibility

The primary problem of this study was the determination of the financial feasibility of a particular regional reference laboratory. A judgement concerning this problem was based on sufficient nonmonetary and financial data, which were collected and analyzed. A discussion of these findings as they relate to the literature follows.

Shared Service

Shared Service, as it relates to the financial feasibility of the present reference laboratory, can be discussed in terms of improved service at less cost. By sharing ser-

vices through the regional laboratory, duplication of equipment, supplies, and personnel were avoided and government pressures were satisfied in this study (cf. Brown 1976:41; Fritschen 1978:22-37; Frazer 1980:89-104; Townsend and Lucas 1979:107-112; Amador 1978:337-352).

An indication of the need for shared service was the \$391,200 spent in 1978 on laboratory reference work by the hospital management corporation's hospitals. This figure was extracted from the questionnaire sent to the corporation's hospitals in late 1978. The trend toward increased demands for service as indicated by Perna (1980) further prompted the corporation to consider shared service as a viable alternative to duplication of all services in each hospital. The capture and use of such amounts was the indication in part for the revenue trend in which the present laboratory finds itself.

Mergers

The merger of the present laboratory and the hospital management corporation constituted a foundation for studying shared service. It also enabled the corporation to study the financial feasibility of establishing regional reference laboratories in other areas. This management corporation is a multi-institutional organization similar to those discussed in certain literature (cf. Starkweather 1970:4:38; Sieverts and Sigmond 1970:261-263; Lauback et al. 1980:

8; Zuckerman 1979:3-12; Platou and Rice 1974:15-20). The merger was a logical step toward improving service for the corporation-owned hospitals while containing costs (cf. Zuckerman 1979:10-12).

Antitrust Regulations

The merger of the present laboratory and the hospital management corporation was accomplished through a purchase of assets, and was, therefore, under the jurisdiction of the Federal Trade Commission (cf. Thompson 1971:70-73). Since the present regional reference laboratory was established for the primary purpose of serving the needs of the hospital management corporation's hospitals, it did not reduce the competition or create a monopoly in the area in which its operations were located (cf. Horne 1971:592). There were more than one hundred hospitals located in the area and only nine of these were owned by the corporation. The regional reference laboratory, under the circumstances defined, did not appear to break any antitrust regulation.

Cost

The continuous rising cost of laboratory service has increased the need for shared service, thus effecting the financial feasibility of a regional reference laboratory. The literature related that in 1978 an excess of \$12 billion was spent on laboratory services (Gallwas 1980:86). This

amount can only increase, for the trend is toward tests being ordered not only for diagnosis, but also for monitoring therapy (cf. Bretcher 1978:615-616; Wertman et al. 1980:2080-2082). Therefore, rising costs and new trends in testing have increased the utilization by the corporation-owned hospitals of the present reference laboratory. This utilization enhancement has increased the probability of the present laboratory financial feasible operation in the 1981 fiscal year.

The operating cost of the regional reference laboratory increased as volume and revenue increased, as was evidenced on the monthly operating statements (table 2 to 10). Gallwas (1980:87) suggested that new technology in the laboratory should increase productivity, thus cutting labor costs. Productivity in the present laboratory was 80 percent, which the corporation considered to be average. Salaries and benefits averaged 33 percent of total expenses represented. Perna (1980) indicated that a 50 percent increase in any test volume would reduce the cost of that test 74 percent. As of May, 1980 this laboratory had not experienced a 50 percent increase in any test volume; therefore, the cost per test had not decreased so significantly for any procedure. Thus, while productivity was good, test volume had not increased to the point where it had become profitable to operate the laboratory.

The Medicare reimbursement regulations which propose to base reimbursement on the lowest cost in the area (cf. Roth 1979:47); Johnson 1980:55-59) and to eliminate payment for admission profiles (cf. Johnson 1980:61) have had little or no effect on the present regional reference laboratory. The regulations have proved to be ineffectual in reference laboratories, because clients (hospitals and physicians) are billed at one-third the fee charged hospital patients. Given that this type of fee structure was the accepted standard in the area, the corporation's reference laboratory charged the "lowest available fee" (pp. 55-59) which is the amount Medicare allows for reimbursement. As regards the Medicare regulation concerning the elimination of payment for admission profiles, the present laboratory had not been affected. One explanation was that physicians appear to be ordering profiles on their patients when admitting them to the hospital. Medicare reimburses for the cost of profiles specifically ordered by a physician when written in addition to routine admission orders (cf. p. 61). Therefore, the reference laboratory experienced no loss of revenue due to either of these regulations.

Financial Management

Sound financial management was a major factor in determining the financial feasibility of the present regional

reference laboratory. Early in the planning stages of the project, a pro forma financial statement was prepared in which the financial needs of the laboratory were anticipated. Financial resources were acquired and funds were allocated, based on the pro forma financial statement. These initial steps constituted good financial planning, according to Christy and Roden (1976:182).

The following documents were prepared in the initial planning stages: (1) a cash budget, (2) an income statement, (3) a balance sheet, (4) a statement of sources and funds, (5) a capital expenditure budget, and (6) an operating budget (cf. Christy and Roden 1976:185). These documents were updated annually with the exception of the balance sheet and income statement, which were updated quarterly by the hospital management corporation.

The present regional reference laboratory's financial position can be measured by profitability and liquidity (cf. Christy and Roden 1976:187). The hospital management corporation related profitability to pretax, preinterest profit. The laboratory as of May, 1980 had not been profitable due to an insufficient volume. A high volume of tests is necessary to make a profit in the reference laboratory business due to markedly lower fee structures (Johnson 1980:55-59; Perna 1980). The present regional laboratory has the capability of becoming liquid due to its purchased

assets and the prospective level of business to be generated. However, the present laboratory is neither profitable nor liquid after nine months of operation.

Financial management tools are used extensively in the institutions owned by the hospital management corporation of present reference. Cost finding reports, expense and revenue budgets, and position and operating statements (cf. Berman and Weeks 1976:3-5) were documents used in the planning and measurement of the achievement of the fiscal objectives of the company. Additionally, historical and projected accounting data were the basis upon which sound financial planning was established. All of these methods were used in measuring and projecting the financial feasibility of the present regional reference laboratory (cf. Seawell 1975:16).

Responsibility accounting is the accounting method used by the hospital management corporation of present reference in its health care facilities. As Seawell stated (1975:138), the responsibility accounting system provides historical data that promote effective budgeting and future projections. This method of accounting was used by the present laboratory and has been beneficial in preparing budgets and making future projections.

Nonmonetary data, such as volume and scope of services, were used also in projecting the 1981 to 1985 income analysis of the regional laboratory (cf. Seawell 1975:139). Projected levels of activity and man-hours were used in planning and budgeting for the future of the regional laboratory. Activity was projected in College of American Pathology workload units (Workload Recording Committee 1980), and man-hours were projected as full-time-equivalent employees. Thus, both types of nonmonetary data were used in calculating the pretax, preinterest income for 1981 to 1985.

The literature revealed that periodic accounting and statistical reports display how well an organization adheres to management's financial plans and objectives (Seawell 1975:16). At the end of each month the corporation required a written operating statement and an oral review of the financial performance of the present reference laboratory. Therefore, these monthly operating statements enabled the hospital management corporation of present reference to evaluate the operations of the laboratory, and to conclude that the present laboratory was continuing to operate at a loss.

Tables 2 through 10 displayed the financial data which were collected each month from September, 1979 to May, 1980. Once all six hospitals were participating with the

regional laboratory, the operating statements remained basically the same. The revenue and expenses stabilized and the resulting loss of profit ranged between \$3,000 and \$8,000 per month. The main explanation for the loss was the deficiency in volume, especially from noncorporation clients. The variance from budget in the revenue from these clients was between \$13,000 and \$19,000 per month. It was evident to the researcher from these deficit revenues that additional noncorporation clients were needed, which could best be attracted by expanding services and the laboratory's capabilities.

There are two reasons why large volumes of tests are necessary for reference laboratories. First, if a reference laboratory offers a test as a service, the procedure must be performed regardless of the number of tests available. Every procedure has a certain number of tests which must be performed in order to break even. Any number of tests performed below the break even point constitutes a loss. The second reason why large volumes of tests are necessary is because the reference laboratory charges approximately one-third the fee charged by hospitals, because a reference laboratory does not include the cost of personnel and supplies for procurement of specimens, processing of specimens, direct patient billing, accepting of Medicare and Medicaid assignments, and audits absorbed by a

hospital laboratory (Roth 1979:97-98; Johnson 1980:55-59). However, operating costs remain much the same as hospital costs for supplies, personnel, space, and equipment.

Solvency, stability, and profitability are criteria for measuring the position of a business and the results of its operations, (Simon and Karrenbrock 1964:771) and are components in the financial analysis of data. The regional reference laboratory after nine months of operation did not meet any of these criteria. However, there are several explanations for these circumstances. The regional reference laboratory could be solvent in time, given the purchased assets and the increasing level of activity being generated. The variable which would be addressed before activity levels can be increased is the expansion of services through additional equipment, physical space, personnel, and a marketing program. The regional laboratory has operated for the past five months at an 80 percent productivity rate and is, therefore, operating at close to capacity. Stability is dependent upon a high volume of sales which relates to the above mentioned solutions to solvency. Therefore, margin on sales must be sufficient to cover operating expenses, interest and dividends to reach stability (Simons and Karrenbrock 1964:772). Given the attainment of solvency and stability, profitability will result. As indicated in the five-year income analysis,

profitability could be a reality in 1981 providing that the expansion of services can be realized. The laboratory has been operating for less than a year and has not had sufficient time to expand into a profitable business. Therefore, additional time, capital, and planning are needed in order for the present laboratory to become profitable.

Problems to Be Addressed

The findings of the study and treatment of the information have indicated to the researcher, that the regional reference laboratory is financially feasible given that certain problems are addressed. A discussion of the problems indicated by the study follows.

One problem to be addressed is the resistance to the present regional reference laboratory by individuals in some of the participating hospitals. There has been evidence of a certain degree of resentment from hospital administrators, medical directors, and laboratory department directors over the loss of autonomy. Seemingly, these individuals did not understand or did not wish to accept the primary objectives of the regional reference laboratory, which were to improve service and reduce costs. Neither did they grasp the broad scope of long-range planning by the hospital management corporation to establish regional reference laboratories nation-wide.

Another problem which the study revealed concerns special procedures being duplicated in some of the hospitals with reagent-rental systems. These procedures should be sent to the regional laboratory in order to reduce duplication of equipment and personnel as well as supplies. For example, there are three other large radioimmunoassay instruments being used by the hospitals identical to the one in the reference laboratory. This duplication represents an unnecessary expense to the corporation.

Based on the activity through May, 1980, it has been projected that more than \$600,000 will be spent by the end of the 1980 fiscal year by the company's hospitals on reference laboratory work in this geographic region. In the absence of the present regional laboratory, this expenditure would have been spent outside the hospital management corporation. Although the laboratory lost money in the early stages of its operation, this study concluded in standard fiscal rationale that the regional reference laboratory could be a viable facility given that certain conditions are met. These conditions are discussed in the following narrative concerning alternative considerations.

Alternatives Considered

Several alternatives concerning the future of the present regional reference laboratory have been presented

to the hospital management corporation by the researcher. The alternatives to be considered which have been recommended were: (1) invest the money necessary to expand the laboratory to a full-service reference laboratory and compete with other reference laboratories for business; (2) sell the laboratory to a large reference laboratory chain; (3) close the laboratory, disperse the equipment among the hospitals, and set up shared services among the hospitals; or (4) continue operating at the same level of service and endeavor to reach a break even point. The choice of one of these alternatives by the hospital management corporation's decision makers would be dependent upon the philosophy, financial position, and long-range plans of the company. These alternatives are discussed, as follows.

A capital investment of approximately \$500,000 would be necessary to expand the laboratory to a full-service laboratory. In addition to capital investments, a dedicated marketing effort also would need to be launched in order to compete with other reference laboratories and increase the volume of activity.

The sale of the laboratory would require the location of a suitable buyer. It would seem advisable, in the writer's opinion, to sell to a reputable reference laboratory chain, which could continue to provide services to the

corporation's hospitals at a reduced rate, based on the large volume of work generated by the hospitals.

A program of shared services could be established which would benefit all of the hospitals by closing the laboratory and dispersing the existing equipment to the various hospitals. The implementation of such a program would take a great deal of planning and cooperation among the hospitals.

The regional laboratory could continue as it is if the philosophy of the company were merely to provide needed services and a profit were not expected. The laboratory could reach a break even point with an increase in dollar volume of \$8,000 per month.

Given the information which this study has generated, this researcher believes that there is a need for a regional reference laboratory, and that it is financially feasible. However, additional planning and capital are vital to the success of such a venture.

Recommendations for further Research

The study generated several questions which are recommended for further research. The recommendations are discussed as follows.

One question which this study generated concerned marketing. It appears that marketing research in the area of regional reference laboratory services would be interest-

ing and beneficial to shared service programs. Aiken (1980), whose job involves marketing reference laboratory services, indicated that limited information is available. However, there was nothing in the literature reviewed by this investigator on the subject. It would seem that since shared laboratory services are being considered in health care to improve the quality of service at a reduced cost, that marketing of these services to health care facilities is important.

Further research which could be pursued is in the area of trends in laboratory medicine as regards the types of tests requested, manpower needs, equipment needs, and new technology. These trends will impact the future of the laboratory by increasing the cost of providing laboratory services. The literature has begun to reflect interest from some researchers in these topics (cf. Wertman et al. 1980:2080-2082; Phillip and Hai 1979:47; Brecher 1978:615 616; Gallwas 1980:86-90).

An interesting area of research would also be a study of government regulations concerning laboratories and the economic impact of the regulations on the future of laboratory medicine (cf. Brown 1976:41; Fritschen 1978:22-37). Along the same economic lines could be a study of third party reimbursement regulations which relate to the laboratory (cf. Roth 1979:97; Johnson 1980:55-59).

Studies could also be performed on cost effectiveness versus cost benefits of specific laboratory tests, such as the various profiles and radioimmunoassay procedures (cf. Wertman et al. 1980:2080-2082).

Outlook

The laboratory is an ever changing part of the health care industry. This researcher continues to find it to be an exciting and challenging place in which to work. There are always new ideas to be researched and new avenues of learning to be pursued. The writer believes that the future of the laboratory industry will be in shared services, offering new organizational patterns, marketing and economics. The regional laboratory will be the center of service for many hospitals and physicians and will offer extensive services to fulfill the needs of all its clients. This investigator foresees the regional laboratory approach as one of the few means of improving the quality of laboratory medicine and controlling costs.

The days of total autonomy in health care institutions are becoming obsolete very rapidly. Management must begin to look carefully at all the alternatives for providing improved, quality services at reduced costs. Shared services through regional facilities appears to be a financially feasible alternative to other methods of providing

quality health care which the public has every right to expect.

Summary

The findings of this study indicated that the pilot regional reference laboratory can be financially feasible. The study design, the instruments, and the techniques used to collect data were supported by and consistent with the literature. Alternatives to the regional reference laboratory were discussed, and the outlook for regionalizing laboratory services appears to be good. This investigator believes that, based on this study, the corporation should consider establishing a subsidiary division of regional reference laboratories to provide regional laboratory services in other areas of the nation. The literature and the findings of this study strongly indicated that the need for shared laboratory services at reduced costs is a reality which should be considered seriously.

APPENDEXES

APPENDIX 1

OPERATING STATEMENT
COMPARISON TO FIXED BUDGET

Hospital _____
 Code _____ Month Ended _____ / _____ Fiscal Year _____ / _____
 IS IN THOUSANDS!

MONTH				YEAR TO DATE		
ACTUAL	BUDGET	VARIANCE		ACTUAL	BUDGET	VARIANCE
			Patient Revenue			
			Inpatient			
			Outpatient			
			Total Patient Revenue			
			Deductions from Revenue			
			Contractual Adj. YE Settl.			
			Medicare			
			Medicaid			
			Other			
			Provision for Doubt Acct.			
			Courtesy Discounts			
			Total Deductions from Revenue			
			Net Patient Revenue			
			Other Revenue			
			Net Revenue			
			Operating Expense			
			Salaries & Benefits			
			Department Supplies			
			Medical Specialist Fees			
			Contract Services			
			Other			
			Total Operating Expenses			
			Contribution Margin			
			% Contribution Margin			
			Non Operating Expense			
			Depreciation & Amortization			
			Interest			
			Rent			
			Taxes & Licenses			
			Other			
			Total Non Operating Expense			
			Pre-Inter. Company Income			
			Plus: Staff Services Sold			
			Less: Staff Services Purchased			
			Cost of Capital			
			Pre-Tax Profit			
			% Pre-Tax Profit			

Favorable (Unfavorable)

SOURCE: Cf. XYZ Hospital Management Corporation.
 Controller's Manual. USA: XYZ Hospital Management
 Corporation, 1978.

APPENDIX 2

PRE-TAX PRE-INTEREST INCOME ANALYSIS

<u>LINE</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
1 GROSS REVENUE					
DEDUCTIONS					
2 Contractual Adj.					
3 Prov. for bad debts					
4 Other					
5 Total					
6 NET REVENUE					
OPERATING EXPENSES					
7 Salaries and Gen.					
8 Supplies					
9 Med. Spec. fees					
10 Contract Services					
11 Other					
12 Total					
13 CONTRIBUTION MARGIN					
14 Depreciation (SL)					
15 Other Non-Operating Exp.					
16 Total Non-Operating Exp.					
17 PRE-TAX PRE-INTEREST INCOME					

SOURCE: Cf. XYZ Hospital Management Corporation. Controller's Manual.
 USA: XYZ Hospital Management Corporation, 1978.

APPENDIX 3

PROFITABILITY INDICES WORKSHEETAverage Pre-tax Pre-interest Return on Original Investment

Pre-Tax Pre-Interest Income (Line 17 from Pre-tax Pre-interest
Income Analysis)

Year 1	_____	Average	Original	%
Year 2	_____	Pre-tax	Investment	Return
Year 3	_____			
Year 4	_____	_____	÷ _____	= _____
Year 5	_____			
Total	_____			
÷ 5 = Average	_____			

Pre-tax Pre-interest Payback Period

	<u>Annual</u>	<u>Cumulative</u>
Original Investment	(_____)	(_____)
Pre-tax Preinterest Year 1	_____	_____
Income Year 2	_____	_____
Year 3	_____	_____
Year 4	_____	_____
Year 5	_____	_____

Pre-tax Payback == Years

SOURCE: Cf. XYZ Hospital Management Corporation.
Controller's Manual. USA: XYZ Hospital Management
Corporation, 1978.

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