

**A COST ANALYSIS OF TWO ACADEMIC-BASED NURSING CENTERS**

**by**

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To my husband Jim, whose love, support, and patience helped to make this dissertation possible.

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## **CHAPTER I**

### **INTRODUCTION**

A nursing center is an ambulatory care clinic in which nurses provide health care to clients and manage both the operational and financial functions of the center (Barger & Rosenfeld, 1993; Gray, 1993). Since 1980, nursing centers, especially academic based centers, have proliferated largely due to the need for clinical teaching sites for undergraduate and graduate nursing students as well as the availability of funding for demonstration projects for underserved populations (Reisch, 1992a).

There are few studies dealing with the cost issues involved in nursing centers and some of these studies have serious methodological or measurement problems. Three studies examined the costs associated with providing care in nursing centers.

An early cost study by Kos and Rothberg (1981) suggested that nursing centers were more costly when compared to care provided at an HMO. However, patient volume was lower for the nursing center than for comparison models. Since cost per visit is a function of volume, theoretically, the nursing center cost per visit could be expected to decrease with an increase in patient volume. This assumes that the nursing center was operating below capacity and could increase patient volume and economies of scale occur. Although this study was conducted many years ago and under a different health care environment, the findings are supported by a recent study by Saywell et al. (1995). This study describes a nurse-managed community health center in rural Indiana. The nursing

center's costs compared favorably with those of comparable, local, primary care physicians when only direct costs were included in the analysis. Direct costs are those costs that are clearly associated with the service or product and are usually under the control of the manager. Indirect costs are more difficult to link to a service or product and are considered to be overhead. The nursing center compared negatively, however, when indirect costs were included in the analysis. This higher cost is largely a function of low patient volume. At full operating capacity, the researchers estimate the nursing clinic cost per visit to be below the prevailing charges in the community.

Kerekes, Jenkins, and Torrisi (1996) analyzed costs of providing care under a fully capitated payment system. According to this study, Abbotsford Community Health Center in Philadelphia had lower in costs than did a comparable family practice HMO with a similar patient population and had fewer hospital admissions, and shorter lengths of stay.

The literature suggests that nursing centers are financially vulnerable and at risk for closing (Barger, 1986a; Barger & Rosenfeld, 1993; Mackey, Adams, and McNiel, 1994). In a study by Barger (1986), 51 nursing centers in 30 states were identified. A follow-up study identified only 41 centers in 25 states. The net loss in nursing centers was attributed to financial instability and to their reimbursement structure.

Lack of direct third-party reimbursement is a significant constraining factor affecting the financial stability of nursing centers. A study of direct payment to nursing centers in Wisconsin found that the nursing centers relied on contracts, direct payment from clients, and grants. None of the nursing centers in this study received payment from Medicare, Medicaid, or private indemnity insurers (Frenn, 1989). A national study of nursing centers reported reimbursement from Medicare, Medicaid, and private insurance

to account for approximately 37% of payments to the average nursing center.

Approximately 30% of the care provided in nursing centers was reimbursed from clients' out-of-pocket payments while another 20% of the care was provided without compensation (Barger & Rosenfeld, 1993).

The majority of nursing centers have been unable to achieve financial self-sufficiency (Mackey & McNiel, 1997). All of these centers remain dependent on funding from charities, grants, and affiliated schools of nursing. One study found that slightly more than 50% of the typical academic-based nursing center's financial support came from their affiliated school of nursing (Barger & Bridges, 1990). Barger and colleagues predicted that a growing number of schools of nursing would be unable to continue to financially support nursing centers (Barger, Nugent, and Bridges, 1993). Hinton Walker (1994) asserts that nursing centers and the nursing profession must shift from an education and service orientation to a business model. Other authors state that nursing centers must "... attend to the business aspects of care and not just to the care itself. Without a sound economic base, care systems will be temporary, transient, and ineffectual" (Mackey, Adams, & McNiel, 1994, p.279).

In order to be successful and develop a healthy economic base, nursing centers must follow sound business practices including the identification of direct and indirect costs of providing care. The inclusion of indirect costs in the economic analysis is critical in obtaining an accurate view of the cost structure for the organization. Understanding these costs is an essential step for nursing centers to achieve economic independence and to survive and prosper in today's cost-conscious environment (Mackey & McNiel, 1997).

### **Purpose of Study**

The purpose of this study is to examine the operational costs of two free-standing, academic-based nursing centers and determine the relative efficiency of operations. Using cost analysis methodology, costs will be categorized and valued and a cost per visit ratio obtained. Both gross costing and activity-based costing methodologies will be used to examine the effects of different costing techniques on the cost per visit ratio.

### **Specific Aims**

The specific aims of the project are to:

1. Develop a cost estimation model using economic and health care theory
2. Analyze the costs of providing care in 2 nursing centers
3. Estimate the effects of employing different costing methodologies on the cost per visit ratio

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## **CHAPTER II**

### **REVIEW OF THE LITERATURE ON NURSING CENTERS**

This chapter presents a review of the literature on nursing centers. First, an overview of nursing centers including definitions of nursing centers is presented. Then the conceptual foundation is presented through a discussion of three historical nursing center models. In the last section, characteristics of nursing centers including mission, patient demographics, services provided, and organizational structure are examined.

#### **Definition of Nursing Centers**

There are many proposed definitions of nursing centers in the nursing literature. In the early 1980s, these definitions were based on the types of services delivered (Ossler, Goodwin, Mariani, & Gillis, 1982) or on the type of service providers (Lang, 1983; Thibodeau & Hawkins, 1987).

In a seminal study, Fehring, Schulte, & Riesch (1986) developed a definition of nursing centers based on the results of a Delphi survey. In this study, a panel of experts was recruited from the participants at the Second Biennial Conference on Nurse Managed Centers and data were collected in three rounds. In the first round, a 22 item instrument addressing some issues deemed by the researchers to be relevant to nursing centers was used. The response format was a 7 point Likert scale ranging from not characteristic to very characteristic. During the first round respondents were given an opportunity to

include other pertinent items to the scale. By the third round, 6 additional items had been added to the survey instrument. The Cronbach alpha for the new 28 item scale reached 0.713, indicating adequate internal consistency.

Based on their study results, Fehring, et al. (1986), formulated the following definition of nursing centers: "Nurse-Managed Centers are organizations that provide direct access to professional nurses who offer holistic, client-centered health services for reimbursement...Services are targeted to underserved individuals and groups." (P. 63). Additionally, the authors state that Nurse-Managed Centers must have a nurse as the administrator or chief executive officer. This definition is in keeping with nursings' philosophy and history of service to the poor, as well as the struggle with organized medicine for control of nursing practice.

In 1987, the American Nurses' Association published a definition of nursing centers that was developed by the Nursing Centers Task Force of the American Nurses' Association. According to this definition nursing centers provide the following: direct client access to nursing services; health services provided by nurses; holistic and client-centered services; reimbursement of services; accountability and responsibility for client care retained by the professional nurse; overall accountability for the center resides with a nurse executive (Aydelotte et al., 1987). The nursing profession appears to have accepted the ANA definition as work published after 1987 cite it as the definitive definition of nursing centers. Nursing centers can be based on a variety of organizational configurations including independent practices, or affiliations with either academic institutions or health service agencies.

Subsequent to the work of Fehring, Schulte, & Riesch (1986) and the ensuing ANA publication (1987), definitions of nursing centers in the literature consistently demonstrate the following two common themes: clients, families, and the community can directly access nursing care and the practice is controlled by nurses (Frenn, Lundeen, Martin, Riesch, & Wilson, 1996)). This distinguishes nursing centers from other community health or primary care centers in which another professional, generally a physician, controls the practice and often limits access to nursing services.

According to Riesch (1992b), the dominant theme in all of these definitions is that nurses control their practice and provide patient care. Riesch also identifies the education of nursing students and the provision of an environment for nursing research as important components of a nursing center. Terms such as community nursing center, nurse-managed center or clinic, and community nursing organization are all used interchangeably when referring to nursing centers (Riesch, 1992b). Definitions of nursing centers are presented in Table 1.

For purposes of this paper, a nursing center is defined as an organization that provides direct services to clients. These services, provided by professional nurses, include but are not limited to: primary health care, health and wellness promotion and education. Though providers other than professional nurses may be involved in the client's care, the nurse retains the accountability and responsibility for the client's care. Additionally, a nurse executive retains the overall accountability for the management and direction of the nursing center.

Table 1

Definitions of Nurse-Managed Centers

Study	Definition
Kos & Rothberg, 1981	A free standing center in which nurse practitioners provide primary health care.
Ossler et al., 1982	An expanded community-mental health model which integrates community assessment, primary care, education and nursing research
Lang, 1983	A setting in which clients receive care and education that is completely nurse-managed
Thibodeau & Hawkins, 1987	A model of nursing practice, education, and research that is staffed and managed by nurses
Fehring et al., 1986	Organizations that are nurse managed and provide direct access to professional nursing services and. Services are holistic, client-centered & reimbursable. Using nursing models, nurses diagnose and treat health problems, provide health education, & serve as sites for nursing education & research
American Nurses' Association, 1987	Clients have direct access to holistic nursing services, the professional nurse retains accountability and responsibility for client care and a nurse executive retains the overall accountability for the center.
Barger, S., 1990	Direct client access to nursing services; nurses provide the health services; services are holistic and client-centered; services are reimbursed; the professional nurse retains accountability and responsibility for client care; a nurse executive retains the overall accountability for the center
Riesch, S. 1992a	Nurse control of practice and patient care & serves to shape future generations of nurses & provides environment for nursing research
Borman et al., 1994	Organizations that provide direct client access to professional nursing services. Uses key points from ANA
Watson, L., 1996	Give direct access to professional nurses who provide health education & promotion as well as health related research

### **History of Nursing Centers**

Contemporary nursing centers can trace their conceptual underpinnings to public health nursing and the work of Lillian Wald and the Henry Street Settlement (Glass, 1989; Aydelotte & Gregory, 1989; Holthaus, 1993). By examining the historical context of nursing centers we can better understand this contemporary model for the delivery of nursing care. Since contemporary nursing centers are the focus of this paper, no attempt was made to present an exhaustive review of historical nursing centers. This section provides an overview of nursing centers prior to 1940 and includes three examples of historical nursing centers.

According to Glass (1989), contemporary nursing centers can trace their roots to the concept of public health nursing. In 1873, the first Nightingale school of nursing opened in the United States (Glass, 1989; Kalisch & Kalisch, 1986). Hospitals were staffed by nursing students and graduate nurses sought employment as either private duty nurses or as visiting nurses.

Visiting nurses, usually under the sponsorship of some charitable organization, provided nursing services to the poor. These services included personal care of the ill such as bathing, feeding, changing dressings, and education of family members to improve hygiene and sanitary conditions. The affluent were cared for at home by private duty professional nurses while the middle class were rarely recipients of professional nursing services. Relatives or untrained nurses provided in home care to the ill of the middle class.

Glass (1989) states that visiting nursing has its genesis in the humanitarian movement of the early 1900s. As a result of this societal concern for improving

conditions for the poor, many social service-type activities and organizations emerged. These activities began in London and gradually spread across the Atlantic to the United States. Examples of philanthropic or humanitarian activities and organizations of this time period are the settlement house movement, and the Young Men's Christian Association (YMCA) and Young Women's Christian Association (YWCA). In the United States, the YMCA was founded in 1851 and the YWCA in 1866. Education, physical fitness, and exercise programs were developed to improve the physical and spiritual well-being of the communities served by these organizations.

After exposure to the settlement house movement in London, Jane Adams returned to the United States and founded Hull House in Chicago in 1889. This was the first settlement house in the United States. According to Adams (1924) "the Settlement is an experimental effort to aid in the solution of the social and industrial problems which are engendered by the modern conditions of life in a great city...and attempts to relieve the overaccumulation at one end of society and the destitution at the other" (p. 126). Health education and hygiene programs were among the services provided by the settlement houses.

Visiting nursing in the United States is believed to have begun in 1877 when the Women's Branch of the New York City Mission sent nurses into the homes of the indigent (Kalisch & Kalisch, 1986). The visiting nurse concept slowly spread throughout the United States. By 1890, 21 visiting nursing organizations were in operation in several large cities (Kalisch & Kalisch, 1986). The settlement house became a popular model for

the delivery of visiting nursing care. Lillian Wald's Henry Street Settlement House is arguably the best known of these settlement models.

### **Lillian Wald and the Henry Street Settlement**

In 1893, Lillian Wald and Mary Brewster established the first of their settlement houses in a Lower East Side slum of New York City. According to the Kalischs' (1986), Wald and Brewster developed the concept of nurses willing to provide their services to all who required them regardless of the client's ability to pay. Prior to this, professional nursing services were only available to the upper classes or, through charitable organizations, to the very poor.

The Henry Street Settlement was unlike previous visiting nurse organizations in two important ways. The Settlement was not aligned with any religious group and it provided health education as well as standard visiting nurse care. Wald established several guiding principles for the delivery of nursing care by settlement house nurses. Although nursing care of the ill was the primary focus, in this model health education was next in importance. The nurse was to respond to direct requests for care by the clients as well as requests from physicians. Thus, the notion of clients having direct access to nursing services was initiated. Fees were based on the client's ability to pay but due to the economic situation of many of the clients, much of the care was uncompensated (Kalisch & Kalisch, 1986).

Gradually, the concept of visiting nursing gave rise to the concept of public health nursing. The latter combined nursing care of the sick, done by the visiting nurse, with

health education and a focus on improving the environmental conditions in the community as well as the home (Glass, 1989; Jossens & Ferjancsik, 1996).

Lillian Wald is credited for coining the phrase “public health nursing”. This term was chosen as the name for the newly organized National Organization for Public Health Nursing as being more inclusive than was the term visiting nursing (Glass, 1989; Kalisch & Kalisch, 1986). Wald conceptualized public health nursing agencies as combining nursing work with civic work. In Wald’s conceptualization, environmental factors such as contaminated water supplies and inadequate living conditions contributed to poor health. Therefore, public health nurses must seek out the underlying causes of illness and misery, strive to improve these environmental and social ills, and provide traditional nursing services (Wald, 1915).

The number of agencies providing public health nursing services grew rapidly in the 20 years between 1901 and 1921, increasing from 58 such agencies in 1901 to approximately 4,000 in 1921 (Glass, 1989). During this same time period, state health departments had begun to employ nurses for the provision of public health services. Eventually, these state health departments became the main source of public health nursing services.

### **Margaret Sanger and Planned Parenthood**

Employed with Lillian Wald’s Visiting Nurse Association in the immigrant sections of New York City’s Lower East Side, Margaret Sanger is another nurse who became interested in combining nursing with health education and social reform. Her visiting nurse experiences heightened Sanger’s awareness of the physical and social ills brought

about by unplanned and unwanted pregnancies. In 1910, she began to lecture about the lives of poor immigrant women and criticized the social and legal restrictions prohibiting open discussion of sexuality and reproduction (Chesler, 1992). In 1912, Sanger began to write a weekly column on sex education and health for a popular socialist daily newspaper. In the same year, textile workers went on strike in Lawrence, Massachusetts. Previous strikes had failed primarily due to starvation conditions faced by the strikers' children. In order to avoid this problem, the strikers agreed to have their children sent to homes of labor sympathizers in nearby New York City. Sanger was asked by New York labor leaders to direct this evacuation of the laborers' children (Kalisch & Kalisch, 1986). Her testimony before Congress on the physical conditions of the children raised sympathies for the strikers and she gained national recognition. This early experience in political organization, advocacy, and lobbying proved invaluable in her career as a birth control proponent (Chesler, 1992).

A turning point for Sanger came in 1912, when she was working as a visiting nurse. After taking care of a 28 year old woman who died as the result of a self induced abortion, Sanger became convinced she must do whatever was necessary to "...seek out the root of evil, to change the destiny of mothers whose miseries were as vast as the sky." (Sanger, 1938, p. 92). Despite the legal and social obstacles, she embarked on a course to learn about and disseminate contraceptive information. Sanger envisioned a system of birth control facilities staffed by nurses and physicians who would promote the health and well-being of poor and working class women. In 1916 she opened the first birth-control clinic in the United States. Sanger's vision of independent, not-for-profit health care

facilities became the model for the distribution of contraception in the United States (Chesler, 1992). Although the organization she founded was medically oriented, much of the care in these clinics today is provided by nurses.

Sanger and her sister, a registered nurse, provided contraceptive information and health education. A social worker and multilingual volunteer who helped with client intake and record keeping completed the clinic's staff. Nine days after the clinic opened, it was raided by the vice squad of the New York City Police Department.

Because the Comstock Act of 1873 made the dissemination of contraceptive information illegal, Sanger was jailed and the clinic was closed. Due to the legal maneuvering of her attorney, a judicial interpretation of the Comstock Act was made which allowed physicians to prescribe contraception for broadly defined medical reasons. This decision offered protection from prosecution to physicians but not to nurses. Sanger wanted nurses included in the exemption and had her attorney petition the U. S. Supreme Court but the court refused to hear the case (Chesler, 1992). Undaunted, Sanger continued to pursue her vision of what nurses should be doing for people (Glass, 1989). In 1921 she established the American Birth Control League and in 1928 founded the National Committee on Federal Legislation for Birth Control. The latter was the forerunner of the Planned Parenthood Federation which continues to provide contraception, health care, and health education services (Glass, 1989; Chesler, 1992).

### **The Kentucky Frontier Nursing Service**

In 1923, Mary Breckinridge conducted a survey of three rural counties in Kentucky. The purpose of the study was to determine what types of nursing services were

needed as well as where these services were needed. Based on the survey results, Breckinridge concluded that there was an inadequate supply of physicians and too many inadequately trained “granny midwives” (Glass, 1989; Kalisch & Kalisch, 1986). Breckinridge had spent some time in Scotland studying their health services delivery system. Based on the results of her study in Kentucky and her observation of the Scottish system, Breckinridge proposed a decentralized delivery system which provided midwifery and public health nursing services to families in the area she had surveyed.

Breckinridge also instituted the concept of a prospective payment system. A fee of one dollar per householder per year was charged with an additional fee of five dollars for maternity care. These fees were competitive with the fees charged by the “granny midwives” (Glass, 1989; Kalisch & Kalisch, 1986). Although the prospective payment system for nursing services was innovative, the moneys collected were not enough to make the Frontier Nursing Service self sufficient. Breckinridge also solicited donations of money and supplies, necessary for the day to day operations of the Frontier Nursing Service.

Breckinridge opened the first Kentucky nursing center in Leslie County in September 1925. No marketing of the center was done, yet in the first month, 233 patients were seen for a total of 561 visits (Glass, 1989). Based on the obvious need in the area, a second nursing center was opened in October of the same year. Within 5 years, a total of six nursing centers were opened. Each site was termed a “nursing center” and was named after a donor. Each center served a five-mile radius and was staffed by a minimum of two nurse midwives. The services provided by each center included

obstetrical care, infant and preschool hygiene, bedside nursing care, and immunizations and other public health activities.

The Frontier Nursing Service continues to provide midwifery services, skilled nursing care of the sick of all ages, and health promotion and education. The Frontier Nursing Service is a legacy to contemporary nursing centers in terms of using community assessment, providing services to the poor and medically underserved populations, and the term nursing center itself.

### **Resurgence of Nursing Centers**

Wald, Sanger, and Breckinridge used a variety of techniques to perform community assessments and provide nursing services according to the documented need. Each pioneer believed in providing nursing services and health information to the poor and underserved. Ultimately each established nurse-managed centers in which clients, families, and the community had direct access to nursing care and health education.

From approximately 1890 to 1930, nurse-managed centers were considered to be acceptable forms of health and nursing care delivery for the general public. The nurses previously mentioned were instrumental in bringing about social change and change in the delivery of health care in the United States. The Great Depression and World War II also brought about social and economic upheaval which affected all areas of life in the United States. The Depression made it difficult for private duty nurses to find work in homes and they increasingly sought employment in hospitals. This time period saw the decline of private duty nursing and the growth of hospital nursing (Kalisch & Kalisch, 1986).

The locus of medical and nursing care shifted from the home to the hospital with advances in medical technology and the advent of medical specialties. Advances in surgical and obstetrical technology and the availability of anesthesia attracted physicians and patients to hospitals. By the late 1920s tonsillectomies, appendicitis, accidents, and obstetrical care accounted for 60 percent of all hospital admissions (Stevens, 1989). Hospital-based technology continued to grow and by the mid-1930s home care was rarely an option for many illnesses (Stevens; Reiser & Anbar, 1984).

Health insurance was another factor in the growth of hospital nursing. Health insurance, which provided for hospital but not home nursing care, became widespread when it became linked to employment during the 1940s. Physicians, represented on both hospital and health insurance boards, were able to consolidate their hold on both health insurance and the delivery of health care. Under this new archetype of health care delivery, nursing centers languished but did not completely die out.

From the late 1920s to the 1960s, few nursing centers survived and even fewer were created. Nursing centers began to have a resurgence in the 1960s and began to flourish in the 1980s due to the emergence of nurse practitioners and by opportunities to develop demonstration projects for the care of the underserved. A series of federal, state, and private foundation initiatives made available grant moneys to develop primary care programs for the medically underserved (Riesch, 1992a).

The 1960s was a period of significant social and political change. There was abundant federal funding which, combined with changing social awareness, gave birth to liberalization of health care legislation and federally funded social programs. Health care

was not immune to the changes taking place. The Economic Opportunity Act of 1964 provided funds for Head Start programs, maternal and child care programs, and public health training programs (Holthaus, 1993). Medicare and Medicaid were created in 1965 when the Social Security Act was amended. As a consequence of the readily available funds and proliferation of programs, health care costs rose rapidly and the need for more primary care became apparent (Holthaus, 1993).

In 1963, the Loeb Center at Montifiore Hospital in New York City was established. A nurse executive managed the center and all nursing care was provided by professional nurses. This nursing center provided intensive nursing services in what today would be termed a subacute unit. Patients in this unit no longer required intensive hospital care but still needed nursing care and were too ill to be sent home (Aydelotte & Gregory, 1989; Riesch, 1992b).

During the 1960s, there was concern in the health professions about the need to improve access to primary care services. Since many physicians were entering into specialty practice, there was also an inadequate supply of physicians able to provide primary care services. In order to improve access to primary care, models utilizing non-physician providers were developed.

### **Nurse Practitioners Aid in the Revival of Nursing Centers**

In 1965, a formal educational nurse practitioner program was established at the University of Colorado. Nurse practitioners were defined as professional nurses who had additional education and provided primary health care and health education and promotion. Unlike other professional nurses, nurse practitioners were able to provide

primary care and direct access to nursing services. The spiraling cost of health care, a focus on primary care, and societal concern for the need to provide health care to underserved populations provided opportunities for nursing center demonstration projects and an increase in the number of nursing centers (Frenn et al., 1996).

Contemporary nursing centers evolved from the foundations laid by nursing pioneers during the 1970s. Milio's (1970) storefront clinic in Detroit and Kinlien's (1972) independent nursing practice were early examples of the return in nursing centers. Nurse-managed birthing centers were also developed in the 1970s. Maternity Care Associates established an out-of-hospital birthing center model which has been widely replicated throughout the United States (Lubic, 1983). In addition to changes in nursing practice, certain societal forces, such as the trend toward primary care, prepared the ground for the revival of nursing centers (Riesch, 1992b; Holthaus, 1993; Frenn et al., 1996).

### **Academic-Based Nursing Centers**

The development of contemporary academic-based nursing centers was driven by three factors within nursing education which are well documented in the literature. According to Riesch (1986), many schools of nursing changed curricula to reflect a nursing rather than a medical model of practice. Since the medical model predominated in most health care institutions, the focus was on illness and access to healthy populations by nursing students was limited. Therefore, they did not meet the curricular objectives for community health nursing courses. Some colleges and universities developed new models of nursing care delivery in order to meet these objectives for student learning. The search for alternative models of nursing care delivery led to the emergence of academic nursing

centers (Riesch, 1986; Barger & Bridges, 1990; Riesch, 1992a; Holthaus, 1993; Barger, 1995).

The second driving force was the barrier to practice perceived by nursing faculty. In the mid-1970s, clinical and research opportunities for students were controlled by the individual institution and its staff rather than by nursing faculty responsible for student education (Riesch, 1986; Barger, 1990; Riesch, 1992a). In addition, opportunities for nursing faculty to combine education, research, and practice were limited in these medical model institutions. Because nursing centers utilized a nursing model in the provision of health care, they had the potential to provide nursing students and faculty with access to healthy populations and serve as practice and research sites for faculty (Riesch, 1992a).

### **Nursing Center Profile**

The research literature on nursing centers is in the early stages. As recently as 1986, Riesch, Fehring, Schulte, and Wright, reported that little research had been conducted in nursing centers. To date, the preponderance of the literature is anecdotal. The empirical literature that does exist is largely descriptive and focuses on describing the characteristics of nursing centers. These descriptions include purposes of nursing centers, populations served, and services provided. The empirical literature also describes the number of academic nursing centers. Literature describing nonacademic nursing centers is extremely limited largely because of the difficulty involved in identifying these centers. Nonacademic centers can vary from independent solo practices to group practices affiliated with a health care agency and no national data base or registry for nonacademic nursing centers exists.

The process of starting a nursing center is well documented in the anecdotal literature (Culbert-Hinthorn, Fiscella, & Shortridge, 1985; Davis, 1993; Lundeen, 1989; Riesch, 1986; Steel, Wagner, Adams-Davis, & Fitzpatrick, 1994; Yoder, 1996). These articles are not supplemented by empirical studies and generally describe the development of only one specific nursing center.

### **Patient Demographics**

A study by Higgs (1988) of academic based nursing centers found that these centers serve clients of all ages, races, and economic levels but the focus tends to be on the underserved and the poor.

Barger and Bridges' (1990) survey of 68 colleges or schools of nursing identified as once having had a nursing center found that 45 (68%) of those schools were currently operating a nursing center. The general community was the population served for almost half of the nursing centers, with senior citizens being the next most targeted population group. Other centers focused on special populations such as low-income, university community, or people with specific diseases.

A National League of Nursing survey conducted in 1991, identified some 250 nursing centers throughout the United States (Unknown, 1993; Lockhart, 1995). The researchers collected data on client demographics, organizational structure, services, and a profile of cost and payment structure. Results from this study support the findings of the previous studies. The authors report that 40% of nursing centers care for the general public while others concentrate on specific populations such as the homeless, elderly, or people with AIDS. The findings indicate that nursing center client loads are

disproportionately composed of minority and low income people. According to this study, 63% of nursing center clients have incomes below \$15,000.

Barger and Rosenfeld (1993) report on the results of another NLN study of academic nursing centers. The stated purpose was to identify characteristics of successful academic nursing centers as measured by cost, access, and quality indicators. Cost was measured as cost per client served but operational definitions and measures for access and quality were not reported in the article. The researchers used a survey to obtain descriptive data on geographic location and staffing patterns of nursing centers, client demographics, services offered, and cost and payment information. The NLN identified 170 centers for inclusion in the sample and 57% responded to the survey. Results of the study indicate that client loads in nursing centers are disproportionately minority, low income, young and very old clients. These results are also supported by survey results from Watson (1996). Cost per client served was calculated using annual budget and number of unduplicated client data. Costs per client served were \$252 per year for the average nursing center. Data on the number of visits per client were not reported.

### **Mission of Nursing Centers**

The mission of a nursing center can be to provide health care to the underserved, function as a clinical education site for students, and to serve as a laboratory for nursing research. In a survey of participants at a seminar on nursing centers, community service and student education were the two most common purposes for nursing centers (Roehrig, 1989). A study by Barger and Bridges (1990) had similar findings. In this study, community service was the primary mission for 89% of nursing centers while student

education was a component of the mission for 61% of nursing centers. Research and faculty practice were part of the mission for slightly less than half of the responding nursing centers. This study identified three purposes for a school to have a nursing center; provide community service, student education, and serve as sites for faculty practice and research. Despite these stated purposes, the study found that only 25% of students at any academic level had any experience in the school's nursing center. Additionally, faculty reported conducting less than one study per year in the nursing centers (Barger & Bridges, 1990).

### **Services Provided**

Nursing centers provide a variety of services ranging from health education and wellness classes to primary care and case management. Higgs (1988) and Aydelotte and Gregory (1989) found that academic based nursing centers provide primary care, health teaching, screening, and referrals to other providers or agencies.

In Roehrig's (1989) survey of participants at a seminar on nursing centers the most frequently mentioned services provided were physical assessment, client education, and counseling. A serious limitation in this study is the lack of consensus among respondents about the conceptual definition of the term nurse-managed center. A definition of this term is not included in the report of the study and no validity or reliability information is reported for the instrument used in the study. Data from the survey does support the findings of previous studies on purpose and services provided.

In the 1991 NLN study, primary care was the principle service offered, followed by health assessments and screening, and education and counseling services. Studies by

Barger and Bridges (1990), Barger and Rosenfeld (1993), Barger, Nugent, and Bridges (1993), and Watson (1996) also found primary care to be provided by a plurality of nursing centers. Table 2 summarizes the studies and services provided.

### **Organizational Structure of Nursing Centers**

The organizational structure of an agency is the framework that guides the lines of communication among positions or individuals, and determines the distribution of power, the allocation of resources, and the locus of decision making in a given organization. Several studies have examined the organizational structure of nursing centers. Barger (1986) attempted to identify all operating academic based nursing centers. This study focused on organizational characteristics of colleges or universities with nursing centers versus those without nursing centers. Barger reports that a school of nursing with a nursing center tends to be large, with more than 35 faculty members and is most often in a public institution (Barger, 1986).

Barger and Bridges (1990), in their study of 45 academic based nursing centers report that the average nursing center has been in existence for 5 years, is located in the school of nursing building, and serves the general community. Findings from the 1991 NLN study of 250 nursing centers, reveal that nursing centers are diverse in organizational structure, staffing patterns, and services offered. The majority (56%) of nursing centers have an institutional affiliation with a nursing school, hospital, or other health care organization. In a follow-up study by Barger, Nugent, and Bridges (1993), surveys were mailed to 462 National League for Nursing accredited, baccalaureate, nursing programs. The purpose of the study was to compare schools of nursing with nursing centers to those

Table 2

Commonly Provided Services in Nursing Centers

<u>Study</u>	<u>N</u>	<u>Design</u>	<u>Services</u>	<u>Comment</u>
Aydelotte, & Gregory, 1988	365 nurses	Descriptive, Survey	Primary care, health education & promotion & disease prevention	Compares nurses in private practice with nursing centers
Higgs, 1989	87 schools	Descriptive, telephone survey	Varied depending on site & model	Uses data to develop 4 distinct models of nursing centers
Roehrig, 1989	30 nurses	Descriptive, Survey, convenience sample	Primary care, health education & promotion	Describes commonalties in purpose, management, and evaluation of nursing centers
Barger & Bridges, 1990	68 schools	Descriptive, survey	Physical assessment, health promotion/disease prevention	Provides profile of academic nursing center
Barger & Rosenfeld, 1993	170 nursing centers	Descriptive, survey	Primary Care, health screening, health education	Examines nursing centers in all types of settings. Identifies characteristics of successful centers
Barger & Bridges, 1993	80 nursing centers	Descriptive, survey	Primary Care, health education & promotion	Examines nursing centers across settings. Authors point out difficulty in identifying nursing centers
Watson, 1996	117 nursing centers	Descriptive, survey	Primary Care	Compares academic and nonacademic nursing centers

without nursing centers. The findings were similar to the 1986 study by Barger. The typical school of nursing with a nursing center is located in a public college or university that does not have a health science center. The school is large, has 34 faculty members, and offers a master's degree.

Findings from the 1993 study by Barger and Rosenfeld support the results from previous studies. This study found a preponderance of nursing centers were located in the Pacific Northwest, were affiliated with a school of nursing, and had been established within the five years preceding the study. Survival rates for nursing centers were not reported in this or other studies. Fifty eight percent of the centers reported that an RN was in the position of chief executive officer and another 53% reported an RN was in the position of president or some other title indicating the chief managerial position. The study reports that RN's employed in nursing centers are better educated than their counterparts in other health care delivery systems and 66% are certified in advanced practice. The NLN reports that nursing centers in existence for less than 5 years were more likely to target vulnerable populations such as the homeless or those with AIDS.

Watson (1996) described a profile of the structure and function of nursing centers and looked for major differences between academic based nursing centers and nonacademic centers. Using the Delphi technique, Watson developed a questionnaire which was mailed to 226 agencies and individuals listed as members of the NLN Council for Nursing Centers. Of the 117 responses, 57 reported having a nursing center. Results of this study support the findings of previous studies regarding the organizational structure of nursing centers. Most nursing centers (72%) were affiliated with larger agencies.

Unlike the Barger and Rosenfeld study (1993), Watson found nursing centers located in all regions of the United States. One significant difference between academic and nonacademic based nursing centers is the length of time in operation. Only 16% of academic based nursing centers reported that their nursing centers were in operation for 10 years or more versus 50% of the nonacademic nursing centers.

### **Faculty Practice and Student Education**

Several studies have examined faculty practice opportunities in nursing centers. In some nursing schools there is an organizationally sponsored responsibility for faculty to provide clinical services in the school's nursing centers (Barger, 1986a; Riesch, 1986; Barger & Bridges, 1990). Three studies document faculty practice in nursing centers. In a descriptive survey, Higgs (1988) interviewed faculty from 65 schools of nursing that reported having or once having had a nursing center and 12 schools that were developing a nursing center. This study used individual faculty representatives from each site as respondents rather than surveying all nursing faculty at each site. Higgs reports that 33 percent of the respondents indicated using nursing centers as a personal clinical practice site. In a study by Barger and Bridges (1990), 18 percent of faculty reported that they engaged in clinical practice at their school's nursing center.

The survey of NLN-accredited baccalaureate nursing programs by Barger, Nugent, and Bridges (1993), compared faculty practice in nursing schools with nursing centers to those without nursing centers. Thirty-five percent of schools with nursing centers had faculty practice plans compared with 33 percent in schools without nursing centers.

However, the study found an inverse relationship between the amount of revenue generated by faculty and the presence of a nursing center. The authors state that this inverse relationship is probably the result of the large amount of uncompensated care provided by nursing centers (Barger, Nugent, and Bridges, 1993).

Educational involvement of students in nursing centers was reported in three studies. Thirty-three percent of the respondents reported undergraduate student involvement in nursing centers and 26 percent indicated involvement of graduate students. Approximately 41 percent of the respondents reported both graduate and undergraduate student involvement in NMCs (Higgs, 1988).

Barger & Bridges (1990) report that, on average, one course on both the senior and master's level used the nursing center for clinical experiences. Barger and Kline (1993) report that, at Clemson University, nursing students begin having clinical experiences in the school's nursing center in their sophomore year. Both faculty and students reported satisfaction with the experience. Faculty reported that 63% of all clinical objectives were met and where objectives were not completely met, an inadequate number of patients was the main problem (Barger & Kline, 1993).

### **Financing of Nursing Centers**

Academic-based nursing centers rely on a variety of funding mechanisms such as grants or in-kind support. Few centers are financially stable or even self-supporting. Barger and Bridges (1990), found that the average nursing center depends on the school of nursing for financial support. None of the nursing centers responding to this survey was self supporting. Schools of nursing accounted for about 53% of nursing center

revenue and federal or other grants or other sources such as in-kind support accounted for approximately 17% of revenue.

The 1986 study by Barger located 51 academic-based nursing centers and 2 years later Higgs (1988) found 65. In their 5 year follow-up study, Barger, Nugent, and Bridges (1993), located only 45 academic-based nursing centers, a significant decrease from the previous study. The researchers attribute this change to the financial vulnerability of nursing centers.

The data on reimbursement are troubling and illustrates the financial vulnerability of many nursing centers. According to the 1993 study by Barger and Rosenfeld, Medicaid, Medicare, and other private insurance account for approximately 37% of reimbursement to the average nursing center. Another 20% of the care provided is uncompensated and additional 30% comes from 'out of pocket' payment. This reimbursement structure is significantly different from that of a typical family physician group practice. According to a survey of family practice physicians by the Medical Group Management Association, 32.8% of reimbursement was from Medicare and Medicaid, 35.5% was from fee for service and 30% came from managed care contracts. Data on uncompensated care were not obtained (J. White, personal communication, February 24, 1997).

Barger and Rosenfeld (1993) also found a significant difference in the payment structure between newer nursing centers, those established fewer than 5 years prior to the study, and older nursing centers. Newer centers provide a larger amount of uncompensated care (30%) which puts them at considerable financial risk. The large

amount of uncompensated care, and “out of pocket” payment and the reliance of nursing centers on support from schools of nursing paints a picture of financial instability. Two other studies support this picture of financial vulnerability. Frenn et al. (1996) and Boettcher (1996) found that funding and reimbursement barriers were significant constraining factors reported by nursing centers. Funding mechanisms and services provided by nursing centers are summarized in Table 3.

### **Summary**

Nursing centers have a history dating back to the turn of the century. These historical nursing centers laid the conceptual foundations for contemporary nursing centers by focusing on providing health care services to underserved populations. Contemporary nursing centers have a variety of missions that emphasize community service, nursing student education, and nursing research. Despite the stated mission of serving as sites for student education and nursing research, nursing centers are rarely utilized as clinical practice or research sites. The most common services are primary care and health education. Although nursing centers have diverse organizational structures, the majority have an institutional affiliation with a school of nursing, hospital, or other health care organization. Nursing centers are often dependent on schools of nursing for financial support and have reported difficulties receiving payment for services from third-party payers. The literature on nursing centers is largely descriptive and not critically analytical. While the financial data in the literature for nursing centers depicts financial instability, it is

Table 3

Profile of Nursing Centers

Citation	Sample	Design	Services	Payment/Funding	Comment
Barger & Bridges, 1990	45 schools or colleges with nursing centers	Descriptive, survey	Primary Care, health education, and promotion	53% of nursing centers were supported by the school of nursing 15% funded by third party reimbursement 32% funded by grants or in-kind support	Examined characteristics of academic-based nursing centers
Barger, Nugent, & Bridges, 1993	362 deans of schools of nursing	Descriptive, survey	NA	Inverse relationship between faculty practice & amount of revenue generated by nursing center	Compared schools with & without nursing centers
Barger & Bridges, 1993	80 nursing centers	Descriptive, survey	Primary Care, health education & promotion	53% came from schools of nursing, 15% from fees & 3rd-party reimbursement	Examines nursing centers across settings. Authors point out difficulty in identifying nursing centers
Watson, L 1996	117 nursing centers	Descriptive, survey	Primary Care, health education & promotion	Grant moneys & federal programs, 39% do not charge for services	Compares academic centers with nonacademic centers
Frenn et al, 1996	27 experts	Descriptive, survey	NA	Funding and reimbursement are major barriers to success of nursing centers	Purpose to examine policy issues effecting nursing centers

not carefully measured from an economic perspective and studies examining the survival rates or reasons for failure of nursing centers are lacking.

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## **CHAPTER III**

### **LEGISLATION AND POLICY AFFECTING NURSING CENTERS**

#### **Introduction**

An overview of federal and state legislation affecting nursing centers is presented in this chapter. First a review of the structure of governmental health insurance programs, including Medicare and Medicaid policies and reimbursement regulations, is presented. Then other legislation affecting advanced practice nurses, specifically nurse practice acts and prescriptive authority is introduced and the implications for nursing centers are discussed.

The United States is one of the few industrialized countries that does not provide national health insurance for its citizens. Payment for health care services can come from private insurers, state or federal government programs, or out-of-pocket payment by the patient. Private insurers and governmental health care reimbursement programs are known as third-party payers. In these instances, consumers do not make direct payment for health care services. Rather, the third-party payers act as financial intermediaries between consumers and health care providers (LeBar, 1986). Traditionally, the covered service categories and the payment level have been predetermined through negotiations between the health care provider and the payer.

In the United States, private health care insurance is tied to employment.

Generally, the employer contracts with one or more private insurance company to provide health care insurance for its employees. The employer then pays all or part of the health insurance premium. If the employer only pays part of the premium, the employee payment is deducted by the employer from the employee's paycheck and sent to the insurer. Thus the payment for health care services is often prepaid and removed from the actual delivery of the service (Nelson, 1987; DeLew, Greenberg, and Kinchen, 1992; Mittelstadt, 1993).

During World War II, wage restrictions imposed by the War Labor Board, disallowed labor unions from bargaining for wage increases. However, the War Labor Board did allow voluntary bargaining between employers and labor unions with respect to health care benefits (Nelson, 1987). By 1948, the National Labor Relations Board had ruled that group health benefits were appropriate collective bargaining concerns (Elsberry & Nelson, 1993). Labor unions then switched their bargaining strategies to obtain health care benefits for their members. By 1964, approximately 75% of Americans who had health insurance had acquired it through employee benefit programs (Nelson, 1987). Resources for fee for service indemnity plans were plentiful, and these plans proliferated.

A nation-wide health insurance bill was introduced into Congress in 1942. Though the bill failed to pass, the debate on national health insurance continued for several decades. One product of this debate was the enactment in 1965 of Medicare and Medicaid. The enactment of these two programs greatly expanded the number of people covered by third-party payers. The number of people over the age of 65 who were covered by health insurance nearly doubled with the enactment of Medicare. With the

passage of Medicare and Medicaid, the Federal government became the single largest health insurer in the United States (Maraldo, 1986; DeLew et al., 1992).

## **Medicare**

Medicare provides national health care coverage for the disabled and those 65 years of age or older. Medicare provides health insurance for approximately 13% of the population making it the single largest health insurer in the United States (DeLew et al., 1992). Virtually all of those over the age of 65 are covered under Medicare. In addition, people with certain disabilities or renal failure are also covered under Medicare.

Financing for the Medicare program comes from a combination of payroll taxes, general federal revenues, and premiums. The Medicare payroll tax requires an inter-generational transfer of funds obtained by taxing working people in order to provide benefits to the aged (DeLew et al., 1992). Medicare is comprised of two parts. Part A which provides inpatient hospital care, limited nursing home coverage and home health care services. Part B provides coverage for physician services, treatment for end-stage renal disease, hospital outpatient services, laboratory services, and durable medical equipment (DeLew et al., 1992; Mittelstadt, 1993). Part A is financed through a payroll tax paid during the recipients working years. Unlike Part A, Part B is financed through a voluntary premium payment. Medicare is administered by the Health Care Financing Administration (HCFA) of the Department of Health and Human Services.

Medicare is oriented towards acute care and follows a medical model. Part A of Medicare covers hospital nursing services as part of the payment to hospitals for the inpatient stay. Part B of Medicare only covers nursing services under certain conditions.

Medicare will reimburse for nursing services if the nurse is an employee of a physician and these services are “incident to” the physician service. According to Mittelstadt (1993), this clause states that the nursing service must be provided as incidental to the physician’s service, be commonly provided in physician’s offices, and commonly rendered without charge. The service must also be provided under the direct supervision of the physician. This direct supervision has been defined by HCFA to mean the physician must be on-site but not necessarily in the same room (Mittelstadt, 1993). An immunization would be an example of a nursing service which would be incident to physician’s service and covered under the Medicare “incident to” clause.

For nurse practitioners and other advanced practice nurses, the “incident to” clause is more complicated and more problematic. Services provided by nurse practitioners which meet this clause must be related to the clinical reason for the patient seeing the physician (Mittelstadt, 1993). For example, the physician conducts an assessment and diagnoses Diabetes. On the next visit, the nurse practitioner sees the patient for follow-up and assessment of Diabetic control and nutritional counseling. This follow-up visit to the nurse practitioner would be incident to the physician’s care and would be reimbursable by Medicare. Services provided under the incident to clause are reimburse at 100 percent of the physician rate. However, Medicare must be billed using the physician’s provider number and reimbursement is made directly to the physician (Mittelstadt, 1993).

Until January 1, 1998, Medicare reimbursed nursing services in the following seven areas: nurse practitioner services provided in a federally designated rural health clinic; nurse practitioner services provided in Medicare health maintenance organizations;

services provided by certified registered nurse anesthetists; certified nurse midwifery services; nurse practitioners services provided to residents in nursing facilities; nurse practitioners and clinical nurse specialists services provided in rural areas; and capitated payments made to Community Nursing Organization demonstration projects (Mittelstadt, 1993). After January 1, 1998, Medicare directly reimburses nurse practitioners and clinical nurse specialists regardless of geographic setting, at 85% of what the physician would have been paid for a service covered under Medicare Part B (Pearson, 1998).

The rules governing Medicare's reimbursement policies for nursing are complicated and tend to be piecemeal. Certified nurse midwives are reimbursed at 65% of the prevailing physician charge. Nurse practitioner and clinical nurse specialist services, provided in rural areas, are reimbursed at 85% of the prevailing physician charge for services provided in outpatient settings. Certified registered nurse anesthetist receive different payment rates depending on whether the services are medically directed or nonmedically directed. The 1996 payment rates for nonmedically directed CRNA is the same payment rate for anesthesiologists, for the same service (Mittelstadt, 1993). Many services routinely provided by nurses, such as health education and health promotion activities, are not covered at all.

## **Medicaid**

Medicaid is a state and federally financed health insurance program for certain groups of the poor. In order to be Medicaid eligible, the applicant must be poor as well as aged, blind, disabled, pregnant, or the parent of a dependent child (LeBar, 1986; DeLew et al., 1992). States further define eligibility by defining maximum income and asset

levels. As a consequence, DeLew et al. state that 60 percent of those who fall below the Federal poverty level are Medicaid ineligible. As state and federal welfare reform goes forward, these Medicaid eligibility requirements are becoming more stringent and more low income people are likely to be excluded from the Medicaid program.

Approximately 25 million people are covered by the Medicaid program. Mothers and dependent children comprise the majority (68 percent) of Medicaid recipients (DeLew et al., 1992). The elderly account for approximately 13 percent of Medicaid recipients, the blind and disabled comprise 15 percent, and all others comprise approximately 4 percent of all Medicaid recipients (DeLew et al.).

Medicaid is a state administered program. Broad federal guidelines direct the scope of covered services, the providers who are eligible for reimbursement, the level of payment to providers, and the population groups eligible for Medicaid coverage. Since states administer the Medicaid program, they have the discretion to directly reimburse for nursing services. There are no federal rules prohibiting payment for NP services but there are federal mandates for the coverage of services provided by certain nurse practitioners. These federal mandates are as follows: pediatric and family nurse practitioner services are covered, nurse practitioner services regardless of specialty are covered in rural health clinics; and services provided by certified nurse midwives are covered (Mittelstadt, 1993).

In addition to Medicare and Medicaid, services provided by advanced practice nurses are covered by the Federal Employee Health Benefit Plan and the Civilian Health and Medical Program of the Uniformed Services. A summary of federal reimbursement policy for advanced practice nurses is provided by Table 4.

Table 4:

**Federal Reimbursement Policy of Advanced Practice Nurses**

	Nurse Providers			
	Nurse Practitioner	Certified Nurse Midwife	Certified Registered Nurse Anesthetist	Clinical Nurse Specialist
<b>Federal Programs</b>				
<b>Medicare</b>				
Part A	No	No	No	No
Part B	Yes	Yes	Yes	Yes, in rural areas
MEDICAID	Yes <sup>1</sup>	Yes	State Discretion	State Discretion
CHAMPUS*	Yes	Yes	Yes	Yes, for psychiatric nurse specialists
FEHB**	Yes	Yes	Yes	Yes

<sup>1</sup> States may limit to Pediatric and Family Nurse Practitioners

\*Civilian Health and Medical Program of Uniformed Services

\*\*Federal Employee Health Benefit Program

As the single largest health insurer in the United States, the federal government, especially through Medicare, has been a trend setter for other health insurers (Mittelstadt, 1993). Private insurance plans provide coverage for 86% of those individuals who have some kind of health insurance (Mittelstadt, 1993). Though some of these private insurance plans provide coverage for services received by advance practice nurses, many others either use the Medicare reimbursement guidelines or do not provide coverage for these services at all.

### **Community Nursing Center Act**

The Community Nursing Center Act, introduced into Congress in 1983, authorized direct reimbursement for free-standing community nursing centers. The reimbursement was restricted to nursing services for individuals who are eligible for and in need of home health care under Medicare, well-baby care or health supervision services for infants and children under state Medicaid programs, and individuals who would otherwise require institutionalization (Riesch, 1986). This limited bill failed to pass Congress. However, in 1987, Section 4079 of the Omnibus Reconciliation Act, directed HCFA to test capitated payments to community nursing organizations demonstration sites under the Medicare program (Riesch, 1992a).

Legislation and policy for reimbursement of services provided by advanced practice nurses is haphazard at best. These policies vary from state to state, provider specialty to provider specialty, locale to locale, and insurer to insurer. Nurse-managed centers are faced with many challenges in attempting to secure reimbursement for their services from both government programs and private insurers. These difficulties in

obtaining third-party reimbursement also make it inherently more difficult for nurse-managed centers to compete with other health care facilities for clients. In general, clients find it more attractive to see a provider whose fees are covered by the client's insurer (Rich, 1993). In a study conducted by the American Association of Colleges of Nursing (1994), lack of third-party reimbursement was cited by 67% of respondents as a barrier to their nursing center's ability to operate. Barger (1990) states that "the lack of eligibility for third-party reimbursement is a real threat to the continued existence of these centers" (p. 293). A study by Frenn supports the difficulties nursing centers have in obtaining third-party reimbursement. Frenn (1986) conducted a study to describe the experience of nurses in Wisconsin who received direct payment for clinical nursing services. Included in her study was data on payment to nursing centers affiliated with schools of nursing. None of these centers reported receiving reimbursement from Medicare, Medicaid, CHAMPUS, or private insurers. These centers relied on fee for service payment from clients or contracts with other agencies to provide specific programs.

### **State Legislation Effecting Nursing Centers**

Individual states maintain the authority to regulate professional practice through state professional practice acts which are laws enacted by the individual state's legislature. The acts generally contain a statement of purpose, definition of scope of practice and other terms, and provision for the creation of a board charged with the responsibility for implementation of the law. Occupational practice acts regulate the functions and activities of a given profession and can have wide reaching implications.

## **Nurse Practice Acts**

Nurse Practice Acts define the legal scope of nursing practice in a given state. Since occupational licensure is a responsibility of the individual state, wide variation in scope of practice often exists from state to state (Bullough, 1993). Some practice acts are narrowly proscribed and severely restrict nursing practice. Other states have broad legal authorization that facilitates nursing practice by, for example, establishing formal recognition of advanced nursing practice.

The first professional practice acts were established by organized medicine after much lobbying by the American Medical Association (AMA). In 1847, the AMA began lobbying for medical licensure laws to raise the level of competence of physicians and to limit competition from other health care providers (Bullough, 1993). By the end of the nineteenth century, all states had enacted medical licensure laws. These medical licensure laws broadly defined the physician scope of practice and in so doing had wide reaching implications for other health professions. Subsequent licensure of other health professions, in effect, became amendments to the original medical practice acts (Bullough, 1993).

Nursing followed medicine's lead and sought to establish state licensure as a means of raising practice standards and of limiting competition. The American Nurses Association (ANA) was founded in 1896 and began lobbying for professional state licensure of nurses. This was a difficult task for nursing, since the majority of the profession were women and without the vote were less politically powerful than men. Licensure for nursing was established in phases. First, in 1903, North Carolina passed a

registration act. Other states followed suit and by 1923 all states had a nurse registration act. None of these acts contained a scope of practice or delineated the functions of a registered nurse (Bullough, 1993).

It was not until 1938 that states began to develop nurse practice acts which included the important scope of practice section. In 1955, the American Nurses Association developed a model definition of the practice of nursing. This language was adopted by many states for their nurse practice acts. ANA's model definition contained a disclaimer that nursing did not include any acts of diagnosis, treatment, or prescription of therapeutic measures. According to Bullough (1993), this disclaimer rendered all advanced practice nursing roles illegal. Since the passage of nurse practice acts containing the ANA disclaimer, professional nursing has been trying to undo the damage. Nurse practice acts in many states have been changed to include a broader scope of nursing practice and, in most states, formal recognition of advanced practice nursing is included in the acts.

Formal recognition of advanced practice in the nurse practice act is necessary for acquiring third-party reimbursement from federal and state programs as well as some private insurers. Though obtaining third-party reimbursement is rarely easy, it is nearly impossible for advanced practice nurses functioning in states where advanced practice is not legislatively recognized. Since much of the care in nurse-managed centers is delivered by advanced practice nurses, nurse practice acts can have a profound impact on reimbursement potential and the viability of the nursing center. Nurse practice acts in Michigan and Texas legislatively define nurse practitioners and grant title protection.

### **Prescriptive Privileges**

The legal recognition of advanced practice nurses to prescribe medications is important if nursing centers are to provide adequate care for their clients. Primary care often requires the prescription of new medications or adjusting the dose of previously prescribed medications.

Nurse practitioners have independent prescriptive authority in 17 states. Another 31 states have legislation granting prescriptive authority to nurse practitioners with some limitations or require a degree of physician oversight. Only two states, Illinois and Georgia, do not grant any statutory authority to nurse practitioners (Pearson, 1998).

In areas where advanced practice nurses do not have independent prescriptive authority, medications are often prescribed through a variety of mechanisms. An example of such a mechanism is the utilization of pre-signed prescriptions. In these instances, the nurse or nursing center, runs the risk of being sanctioned by the state for illegal practice.

A telephone survey of 19 Midwestern experts on nursing centers, revealed that lack of prescriptive authority was perceived to significantly effect the operations of nursing centers (Frenn et al., 1996). Percentages of those experts who perceived lack of prescriptive authority to be problematic were not reported.

### **Managed Care**

According to Iglehart (1992), managed care is characterized by a system that integrates financing with the delivery of medical care. This integration is accomplished by utilizing the following: selective contracting with physicians and hospitals to provide comprehensive services to enrollees, capitation, utilization and quality controls, financial

incentives for enrollees to use the physicians and hospitals associated with the plan, and the assumption of financial risk by physicians.

Initially, the term managed care, implied all of Iglehart's criteria and was applied only to various integrated systems such as health maintenance organizations (HMO) and preferred provider organizations (PPO). Now however, the term is used generically to mean the application of a range of utilization controls to manage provider practice regardless of the practice setting (Weiner & de Lissovoy, 1993).

Managed care organizations (MCO) link health care delivery with a capitated system for financing that care by directly employing health care providers or by contracting with physician groups. Managed care organizations often employ advanced practice nurses (APN), such as nurse practitioners or certified nurse midwives, but are often reluctant to contract with APN as primary care providers (Maraldo, 1993).

California APNs found that no MCO would contract with them or list them as primary care providers (Lithgow, 1996). Advanced practice nurses must be listed as primary care providers on managed care rosters in order to receive payment from the MCO. The California APNs organized and with various professional nursing organizations are working to be recognized as primary care providers by managed care organizations (Lithgow, 1996). Recognition of APNs as primary care providers by MCO is vital for nursing centers to compete with other providers for managed care contracts.

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## **CHAPTER IV**

### **COST STUDIES**

#### **Introduction**

This chapter presents a review of cost studies from nursing centers and other relevant literature. First, studies of the costs of providing care in nursing centers are presented. Next, cost studies of free-standing birthing centers are discussed. Finally, studies examining the costs of providing care in community health centers are presented.

#### **Nursing Center Cost Studies**

Though concern over rising health care costs has been documented in the general health care literature for at least a decade, it is only in the last few years that the nursing literature has documented the same concern. As Schroeder (1993) states, it is only recently that cost containment is considered to be an essential component of nursing practice.

Cost control measures have shifted from dependence on regulatory mechanisms to reliance on competition and market forces (Schroeder, 1993). As stated in the funding section of this paper, nursing centers are rarely self-supporting and are financially vulnerable. Sound business practices must be followed by nursing centers if these centers are to become successful (Elsberry & Nelson, 1993; Hinton Walker, 1994b; Starck, Mackey, and Adams, 1995).

A business plan is the foundation of sound business practice. This plan should include not only the organizational structure and services to be offered but also an estimation of costs and an economic analysis (Elsberry & Nelson, 1993; Starck et al., 1995).

Documentation of economic analyses of nursing centers in the literature is limited and much of the discussion is anecdotal or theoretical and not research based. Four relevant studies document nursing center cost issues. These studies are summarized in Table 5.

The 1981 study by Kos and Rothberg is one of the earliest published studies on costs in nursing centers. The researchers describe a program evaluation of a free standing nursing center that targeted a low-income, suburban community. As part of the program evaluation, a simple cost analysis was conducted. The researchers calculated a cost per visit of \$42 for the nursing center. When compared with a cost per visit of \$38 for a public health nurse and \$30 for a physician visit at a local HMO, the nursing center appears to be more costly. It is unclear if the dollar figures for the public health nurse and the HMO reflect charges or actual costs. Patient volume was lower for the nursing center than for the comparison models (Kos & Rothberg, 1981). The methodology is not clearly explained and the researchers report some data collection difficulties. Nevertheless, the study draws some important conclusions. Since cost per visit is a function of volume as well as cost, the nursing center cost per visit could be expected to decrease with an

<u>STUDY</u>	<u>SAMPLE</u>	<u>DESIGN</u>	<u>CHARGE</u> <u>VARIABLE</u>	<u>OUTCOMES</u>	<u>COMMENTS</u>
Kos & Rothberg 1981	Free standing nursing center	Program Evaluation & simple cost analysis	Direct operating costs	Cost per visit compared with physician costs in area	Methodology not fully explained. Only direct costs included
Schroeder 1993	In-hospital nursing center for AIDS patients	Retrospective Descriptive	Hospital charge data	Decreased length of stay, admission & readmission resulted in cost savings	Cost estimates
Saywell, Lassiter, & Flynn 1995	Rural nursing center	Cost Analysis	Direct and indirect costs	Cost per visit of \$64.50, 70% more than comparable physician costs	Indirect costs calculated on fair market value
Kerekes, Jenkins & Torrisi 1996	Nursing Center	Case Study	Cost per member per month	nursing center cost of \$56.72 compared to \$97.96 for aggregate family practice HMO.	Methodology and the process for the calculation of costs not presented.

Table 5: Summary of Nursing Center Cost Studies

increase in patient volume. This conclusion assumes that the nursing center had excess capacity and the ability to increase patient volume and that economies of scale occur.

Schroeder (1993) describes a cost-effectiveness analysis of an in-hospital nursing center specializing in the care of AIDS patients. The costs in this study are actually hospital charge data. Estimates of charges were used to obtain data for supplies since institutional record keeping proved problematic. Though the focus of this study was on determining savings in hospital charges, a cost per visit of \$65 was also reported. How this amount was determined is not reported and comparison amounts with similar AIDS clinics is not given.

Schroeder (1993) reports a cost savings in hospital charges of \$1,163,912 achieved largely through a decrease in length of hospital stay and a reduction in the number of hospital admissions and readmissions. It is important to note that the study's methodology is not completely explained and the dollar amounts are charge estimates.

Saywell et al. (1995) describe a nurse-managed community health center in rural Indiana. Using a rigorous cost analysis methodology, this study analyzed the operating costs of the nurse-managed clinic and determined their relative efficiency. All direct clinic expenditures were included in the analysis as direct costs. Donated supplies, equipment, and services were estimated using a fair market value. The clinic utilized volunteer professional staff as well as paid professional staff. For the volunteers, opportunity costs were calculated using fair market estimates. The results were then compared with the results of the costs of care provided by local primary care physicians. The resulting direct cost for the clinic of \$36 per visit compared favorably with the average cost of \$38 of

comparable, local, primary care physicians. When the opportunity costs for the nurse-managed clinic were factored in the comparison was less favorable. The nursing clinic's cost per visit of \$64.50 exceeded the comparable community charge by 70% (Saywell, Wright, Lassiter, & Flynn, 1995). As in the Kos and Rothberg study, the higher cost is largely a function of low patient volume. At full operating capacity, the researchers estimate the nursing clinic cost per visit to be \$27, which is 28% below the prevailing charges in the community.

Kerekes, Jenkins, and Torrisi (1996) describe Abbottsford Community Health Center in Philadelphia and include cost summary data. This center is located within a public housing project in which all of the households are enrolled in a health maintenance organization. Methodology and the process for the calculation of costs were not presented. The costs per member per month at Abbottsford and those at aggregate family practice type HMOs are compared. Abbottsford was lower in cost at \$56.72 compared to \$97.96 for the aggregate family practice HMO. Although the nursing center saw their members an average of 1.8 times more frequently per month than did the family practice HMO, the nursing center had fewer hospital admissions, and shorter lengths of stay (Kerekes, Jenkins, and Torrisi, 1996).

There are few studies dealing with the cost issues involved in nursing centers and some of these studies have methodological or measurement problems. While some studies do not define cost measures, other studies use cost and charge variables interchangeably. Some studies include indirect costs in the calculation of total costs while others do not.

Studies examining aggregate cost data of nursing centers were not found in the review of the literature.

### **Community Nursing Birth Centers**

Free-standing birthing centers provide prenatal, labor, delivery, and postpartum care. The care in these centers is generally provided by certified nurse midwives. The following studies are included in this paper because they examine costs of care in community based centers in which the care is provided by advanced practice nurses.

Another study describes the development of a free-standing birthing center affiliated with a large university medical center. Care in the birthing center was provided by certified nurse-midwives and included prenatal, labor, delivery, postpartum, and well-baby care. Birthing center costs for prenatal, labor, vaginal delivery, postpartum, and newborn care were reported as \$2183 per patient. This amount includes both facility and provider cost data. These costs were volume dependent and decreased to \$1390 per patient for 100 deliveries per month. Utilization of resources such as ancillary tests were not included in these calculations (Garite, Snell, Walker, and Darrow, 1995).

In a study by Hinton Walker and Stone (1996) two methodologies for comparing costs and outcomes in a community nursing birth center and a traditional hospital systems were used. The first study utilized a decision analysis methodology. In this methodology all available choices and potential choices are identified and a decision tree is constructed (Hinton Walker & Stone, 1996). Major and minor complications of delivery were the outcomes measures which were compared to the costs incurred at each site. In instances where data was charge rather than cost based, the researchers conducted a sensitivity

analysis to determine an estimated charge. The results suggest that delivery in a birthing center is less costly than is delivery at a hospital. The average cost of a delivery at the birth center was reported to be \$3,385 compared to \$4,673 for the hospital.

The second study by Hinton Walker and Stone (1996) used a retrospective, quasi-experimental design to compare the utilization of health care resources and the cost implications of three different obstetrical care models. The models include a free standing birthing center staffed by certified nurse midwives, a women's clinic using both physicians and nurse practitioners, and a traditional, physician only, private group practice. Cost data were obtained from the accounting departments of each facility and included both fixed and variable costs. Delivery fee and provider fee data were obtained from charges and included in the facility costs to obtain total direct costs. MANOVA was used for analyzing the data. Costs at the birthing center were lower than either model using more physician time. When length of stay and nursery costs were factored in, the cost-effectiveness of the birthing center was even more favorable (Hinton Walker & Stone, 1996).

### **Community Health Center Cost Studies**

Review of the medical and public health literature reveal much concern and general discussion about the costs of health care (Burns, 1991; Blumstein, 1992; Bischof & Nash, 1996). Though there are many cost analyses, cost-effectiveness analyses, or cost-benefit analyses, most of these focus on a specific disease entity or a specific treatment or intervention. The following articles are included in this paper because they focus on the costs involved in providing care in community-based, primary care clinics. The clinics

described in these articles share the following characteristics with nursing centers: they provide primary care and are community based. Nursing centers and community health centers also have commonalities in their payer mix. Similar to nursing centers, community health centers serve a mix of medically indigent and uninsured populations, Medicare and Medicaid beneficiaries, and privately insured clients. Though some of these clinics utilize nurse practitioners to provide services, the ultimate accountability and responsibility of care remains with the physician medical directors.

Wheeler, Wickizer, and Shortell (1986), examined the financial performance of hospital-sponsored primary care group practices over a five year grant period. Fifty-three community hospital programs were included in their analysis. The typical hospital-sponsored primary care practice was a solo practice located on the hospital grounds in an urban setting. Approximately one-third (34%) of the primary care practices employed nurse practitioners or physician assistants.

Patient volume and number of services provided steadily increased over the grant period. By the fourth year, the monthly productivity corresponded to an average annual figure of 4,586 encounters per physician. The researchers report that this figure is within the standard of number of encounters set by the Bureau of Community Health Services (Wheeler, Wickizer, and Shortell, 1986). As volume increased, the cost per visit decreased with the average cost in year four being \$26.47 in 1980 dollars. Since the methodology included direct costs but only some indirect costs, the researchers report that the cost per visit seriously underestimates the real cost per visit. Nevertheless, the study draws some important conclusions: cost per visit decreases as volume increases, patient

volume is a significant determiner of profitability, and at least three or four years of development time is necessary for a hospital based primary care group practice to reach a break-even point.

Wouters (1990) compared the costs in a preferred provider organization (PPO) with those of non-PPO. The study's objective was to estimate the size and significance of any cost saving attributable to the PPO. Cost estimates based on number of office visits and physician charges were used in the analysis, and cost per episode of care rather than cost per visit was calculated. The study reports that costs per episode were not significantly different for primary care between the PPO and the non-PPO. The PPO costs per episode were somewhat higher than the non-PPO costs per episode. The researcher attributes this to the higher PPO physician charges which may or may not accurately reflect the actual costs of care (Wouters, 1990).

Gravely and Littlefield (1991) examined the relationship between cost and effectiveness of three prenatal clinic staffing models: physician based, mixed staffing, and clinical nurse-specialist staffing. A retrospective record review was conducted to analyze identified pregnancy outcome measures including patient satisfaction. Each patient was interviewed, via a patient satisfaction tool, to determine their level of satisfaction with their care. Financial data was obtained from the financial officer at each site. Only direct costs were used in the determination of the cost per visit. In this study the clinical nurse specialist model had the lowest cost per visit primarily due to the lower salaries of the clinical nurse specialists. Unlike other studies, the clinical nurse specialist model also had

the highest level of productivity which would also lower the cost per visit (Graveley & Littlefield, 1991).

A study by Kay, Share, Jones, Smith, Garcia, and Yeo (1991) compared a community-based prenatal care program for teens with a matched sample of teens who received care at a traditional hospital based prenatal program. The community-based teen prenatal program provided primary care and health education to adolescents and was physician managed. Prenatal care accounted for approximately 20% of the clinics' patient visits. This study compared differences in the processes of care, such as number of patient visits, and outcome measures, such as infant birth weight, and the costs of care. There was a statistically significant difference in the processes of care between the groups. Clients at the community-based program received more prenatal visits but fewer technologically intensive resources. Indeed, the researchers report that costs of the community-based program were 25% to 33% less than the costs of the hospital-based program. Cost data for both sites included only direct costs of care. Average cost per client was \$776 at the community-based center compared with \$1,918 for the hospital-based program (Kay et al., 1991). These studies are summarized in Table 6.

The free-standing birthing center and community health center studies suggest that community-based primary care is less costly than hospital based programs. However, patient volume is a critical factor in determining the cost per visit. As patient volume increases the cost per visit decreases. The study by Wheeler, Wickizer, and Shortell (1986), points out the importance of adequate development time in building a practice and increasing patient volume.

There are some common themes in the studies on nursing centers and those on community-based primary care centers. The inclusion of indirect costs in the economic analysis is important in obtaining an accurate view of the cost structure for the organization. Patient volume is a critical factor in determining cost per visit. In addition, adequate development time is necessary for building an adequate patient base and hence increasing volume. Since only 16% of academic-based nursing centers report being established for longer than 5 years, building adequate development time into their business plans is critical for nursing centers. Building patient volume and improving productivity are also critical issues for the survival of nursing centers (Mackey, Adams, and McNeil, 1994). Special attention must also be paid to changing the payer mix to offset the large amount of uncompensated care provided in nursing centers.

<u>Study</u>	<u>N</u>	<u>Groups</u>	<u>Design</u>	<u>Outcome</u>	<u>Comment</u>
Wheeler, Wickizer, & Shortell, 1986	53 sites	MDs	Combination of descriptive & time series analysis	Costs principally determined by price of MD input & productivity	MD input (salary) major effect on costs. Increased volume led to decreased costs per visit
Wouters 1990	2 sites	MDs	2 group comparison	Costs are estimates based on charges	MD salary & charges have significant effect on costs
Gravely & Littlefield, 1991	3 sites	MD, mixed group, RN	Descriptive, 3 group comparison	Nurse-managed clinic most cost-effective model	Input price of clinical specialist lower than other providers
Kay, Share, Jones, Smith, Garcia, Yeo 1991	180 adolescent clients	Community based program vs. hospital program	Quasi-experimental	Average cost of community based program 40% less than hospital based program	Outcomes were similar for both groups

Table 6: Costs and Community-Based Care

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## **CHAPTER V**

### **CONCEPTUAL FRAMEWORK**

Traditionally, nursing centers have not been self-supporting and have relied on grants or in-kind support to offset operating deficits. The average academic-based nursing center depends on the school of nursing for financial support (Barger & Bridges, 1990). Financial vulnerability has been cited as one of the major causes for closure of academic-based nursing centers (Barger, Nugent, & Bridges, 1993; Higgs, 1988). One study found that only four nursing centers generated revenue that was greater than their expenses (Mackey & McNiel, 1997). Given the cost conscious health care environment, it is unlikely that nursing schools will be able to continue financially supporting nursing centers with operating deficits.

In order to be financially successful, nursing centers must generate sufficient patient revenue to cover their operating expenses, understand their cost structures, and utilize appropriate strategies for minimizing operating costs. Understanding these costs of providing care is a crucial step for nursing centers to achieve economic independence and to survive and prosper in today's cost-conscious environment (Mackey & McNiel, 1997).

Business practices are founded in economic theory which makes several assumptions about the behavior of firms. Economic theory defines a firm as an organization in which inputs are turned into outputs. A nursing center is a firm in which nursing and other worker's time and expertise are combined with the use of medical equipment to produce patient visits. One of the major assumptions in economic theory is that the goal of a firm is to maximize profits (Nicholson, 1994). Profits are the remaining moneys when total costs are subtracted from total revenues.

The theory also states that a necessary condition for profit maximization is the minimization of costs, and a firm will use a combination of inputs that results in the lowest cost to the firm. Nursing centers could produce patient visits utilizing a variety of inputs. The center could use only RNs for all labor activities including those which are usually performed by a receptionist. Intuitively, this is nonsensical since a lower cost labor input could be easily substituted for the RN without any change in the quantity or quality of patient visits produced. In this case, the nursing center could minimize its costs by using a less expensive combination of labor inputs.

The firm's profits can be represented by the following equation:  $\pi = TR - TC$ . Total revenue (TR) is the price of each visit times the number of visits produced. Total costs (TC) are the average cost of a patient visit times the number of patient visits produced. Profits ( $\pi$ ) equal revenue less costs. This equation demonstrates that a factor in the maximization of profits is the minimization of total costs and the greatest amount of profit is generated when costs are minimized and revenues are maximized.

The profit equation illustrates the importance that total costs play in determining profits. Total costs are expressed by the following equation :  $TC = FC + VC$ . Fixed costs (FC) are those expenses that do not vary with fluctuations in patient volume and variable costs (VC) are those that do change with changes in volume. Total costs can also be expressed as average or marginal costs. The average cost is determined by dividing all costs by the quantity produced. Average costs = total costs/quantity. In the case of a nursing center this would be the cost per patient visit. Marginal costs are incremental and are the cost associated with producing one more unit of output (Nicholson, 1994; Lukacs, 1986). Marginal costs = Change in Total Costs/Change in Quantity.

Costs can also be short or long run. The short run is a time period in which the cost of some inputs are fixed. In the long run, often a period of years, the firm can adjust and therefore vary all inputs. Since the time frame for this cost analysis is one year, all

costs were considered to be short run and could, therefore, be classified as fixed or variable.

A firm desiring to maximize profits will make decisions at the margin. The marginal cost for a nursing center is the additional cost of producing one more patient visit and the marginal revenue is the additional revenue received from producing one more patient visit. As long as the marginal revenue is greater than the marginal cost, the nursing center will maximize profits by producing one more patient visit (Nicholson, 1994).

The following is an example of using the margin in the decision making process. A nursing center is interested in obtaining a contract for providing health care to a group of patients. However, if the nursing center takes this contract, the number of patient visits the nursing center currently produces will triple. In order to take care of these additional patients, the nursing center will need to hire another nurse practitioner and need additional supplies. If the additional revenue less the additional costs results in a reasonable profit margin, the nursing center should take the contract. If the additional costs are greater than the extra revenue, the nursing center would lose money by taking the contract and should reject it.

Understanding the nursing center's fixed and variable costs are important for determining profitability strategies. If revenue is less than the nursing center's average cost but greater than its variable costs, the nursing center could improve profitability by producing more revenue generating patient visits. By increasing the quantity of patient visits, the denominator in the equation, the fixed cost per encounter and the total cost per encounter are decreased. However, if total revenues are less than variable costs the firm will lose more money by increasing production (Lukacs, 1986).

Revenues are another factor in determining profitability. Revenues are calculated by multiplying the price of each unit or patient visit by the quantity produced. The revenue equation is  $R = P(Q)$ . The price of each unit of output is important component of total revenues.

The health care market is highly regulated and revenues are constrained by reimbursement policies of insurers. Payment to the nursing center for its product is generally received from either third-party payers or directly from the patient, the actual consumer of the service. For historical and sometimes legislative reasons, third-party payers may or may not reimburse a nursing center for its services (DeLew, Greenberg, & Kinchen, 1992; Mittelstadt, 1993). As discussed in Chapter II, there is considerable variation in the reimbursement by third-party payers for health care services provided by nurses. Because of the difficulties nursing centers have had with third-party payers, nursing centers must build a diverse revenue stream and not rely solely on the third-party reimbursement system (Hinton Walker, 1994a). Diversity in revenue may include contracting directly with employers or with managed care organizations. However, to be financially successful in negotiating a contract, the nursing center must fully understand its cost structure. The focus of this study was on the cost structure of two nursing centers and did not address strategies for generating revenue.

According to the literature, nursing centers have a tri-fold mission: to provide health care to the underserved, to function as a clinical education site for students, and to serve as a laboratory for nursing research (Roehrig, 1989; Barger & Bridges, 1990). In attempting to fulfill their mission, nursing centers generate operating expenses which must be offset by revenue. As the literature reveals, nursing schools can not indefinitely support a nursing centers that incur an operating deficits. By managing their costs and generating patient revenue through diverse sources, nursing centers can achieve financial stability and still pursue their mission.

Market demand is another component of economic theory. Market demand is the total quantity of a product or service purchased by all of the potential buyers at a given price. The quantity of a product or service sold by a firm is dependent on the demand for that product or service. This study focused on the supply side of supply-demand

economic model. The scenario analyses were conducted using the assumption that the nursing center could produce any number of visits at the existing fee.

Attaining financial stability and success are vital for the survival of nursing centers. Financial stability can be achieved by following profit maximization strategies. Profit maximization requires that nursing centers understand and manage their costs. Knowledge of the individual nursing center's cost structure is crucial for successful negotiation of managed care contracts. These contracts have the potential to increase revenue stream diversity and thereby, contribute to financial stability if revenues generated from the contract are greater than the nursing center's average costs.

Many nursing centers are non-profit organizations and may not have profit maximization as a goal. According to Weisbrod (1988), there is often little difference in the behavior of for-profit and not-for-profit organizations. Both types of organizations benefit from understanding and managing costs.

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## **CHAPTER VI**

### **METHODOLOGY**

#### **Introduction**

In this chapter a discussion of cost analysis methodology is presented. First, the various perspectives from which a cost analysis can be conducted are discussed and the characteristics of costs are introduced. Then the techniques for performing a cost analysis are presented. Methods for performing time study analysis are also discussed.

The study used a descriptive retrospective design and examined data for one fiscal year. Data were collected at two free-standing, academic-based nursing centers. The North Campus Nursing Center (NCFHS) in Ann Arbor, Michigan, meets the traditional definition of a nursing center by providing primary health care to an underserved population and by being nurse-managed. This center has relied on grants and in-kind support from the University of Michigan School of Nursing and is not self-supporting. The other site, the University of Texas Health Services in Houston (UTHSC) is also nurse-managed, follows a nursing model, and follows profit maximizing strategies. UTHSC has achieved financial self-sufficiency by following sound business practices and by actively pursuing managed care contracts (Starck, Mackey, & Adams, 1995).

A cost analysis was done for each center using the methodologies of gross and activities-based costing. In gross costing, all costs are aggregated and overhead costs are

allocated to services or products on an arbitrary basis. This allocation is often based on the amount of direct costs incurred by the product or service or the square footage used {Storfjell & Jessup 1996 #2460}. In activities-based costing, activities performed by the organization are identified and their costs are determined (Brimson, 1991). A time study was conducted to obtain data for costing the amount of labor involved in each activity. Descriptive statistics were used to examine the patient populations.

### **Perspective**

Cost analyses can be done from several different perspectives and the costs included in the analyses will vary depending on the chosen perspective. When choosing a perspective, one must consider the groups who will be affected and who are the decision makers. Cost analyses can be conducted from the perspective of society, the health care institution, the third-party payer, or the patient and family.

### **Societal Perspective**

The societal perspective is the broadest and most inclusive of the viewpoints that can be taken. When a cost analysis is conducted using a societal perspective, all significant costs of the program or intervention are considered regardless of who experiences the outcomes or incurs the cost. For example, if managed care for Medicaid recipients reduced the costs for the Medicaid program but increased the costs for the Medicare program, the societal perspective would include both changes (Russell et al., 1996).

**Health Care Institution Perspective**

The institutional perspective is much narrower in scope than is the societal perspective. In the institutional perspective, only those costs incurred by the health care institution itself are included in the analysis. Both direct and indirect costs would be included in the analysis. Costs to be analyzed might include salaries and benefits for staff, building maintenance, rent, supplies and administrative overhead.

**Individual or Family Perspective**

Using the perspective of the family or individual patient, societal or institutional costs are ignored. The costs of providing a service or implementing a program would not be relevant from the patient or family perspective. When using the family perspective, the costs included in the analysis might be the professional or clinic fee charged to the patient, health insurance premiums, transportation costs, and time lost from work.

The appropriate perspective for a cost analysis depends on the objective of the study and the questions to be answered. When considering broad changes in the allocation of health resources many people are likely to be affected. In this instance, a broad societal perspective is generally the most appropriate choice. If the questions are concerned with decisions affecting organizations or specific groups, a narrower viewpoint should be used for conducting the cost analysis (Torrance, Siegel, & Luce, 1996). Since the objective of this paper was to examine nursing centers and their costs of producing patient care, the appropriate perspective is that of the health care institution.

### **Characteristics of Costs**

The purpose of any firm, including nursing centers, is to turn inputs into outputs or products. Inputs are all of the resources used in making a product. Inputs for nursing centers include but are not limited to: labor of advanced practice nurses, labor of receptionists, and medical supplies. Each input is associated with a corresponding cost. Economic theory states that firms should choose the lowest cost combination of inputs that allows the chosen quantity and quality to be produced. In order to accomplish this, the firm must be able to identify all of the costs of inputs involved in production. A cost analysis is a method for identifying and measuring these costs.

The resources used in production are the costs of producing that product. The most common resources included in production are time and money. Due to difficulties in obtaining cost data, health services research often uses charge data as a proxy measure. There is an important distinction between cost and charges. A charge is the fee that a health care provider or institution asks for a particular service while cost is the actual amount of money the health care provider expended in providing the service (Bischof & Nash, 1996). The focus of this study was on cost data.

Cost data include: total costs, direct, indirect, fixed, variable, and marginal costs. The particular costs included in an analysis will change depending on the nature of the cost objective which are any objects for which the cost is to be determined. A cost objective is the unit of analysis and can be a specific patient, group of patients, a specific intervention, a model of service provision, or the entire organization (Finkler, 1994). In this paper, the cost objective is the individual nursing center.

**Direct Costs**

Direct costs are those costs that are clearly associated with the cost objective and are often under the control of the manager. These costs include all of the goods, services, and other resources consumed in production. For a health care institution, direct costs could include the costs of tests, medications, supplies, health care personnel, health care facilities, and outside services (Luce, Manning, Siegel, & Lipscomb, 1996).

**Indirect Costs**

Indirect costs are often referred to as business overhead. They are often more challenging to determine than are direct costs and are more difficult to link to a particular service or product. The following example illustrates this concept. When a nursing center employs a cleaning service, this is an indirect cost. If a nursing center relies on its staff to clean the facility rather than employing a cleaning service, then the time the staff spends cleaning should logically be included as an indirect cost. In this case, cleaning was required for general operations and could not easily be linked to a particular service provided by the nursing center.

**Fixed Costs**

Fixed costs are those that do not vary with a change in the number of patient visits or services provided. Rent for the nursing center's physical space, personnel salaries, and equipment are all fixed costs in the short run. Rent is a fixed cost because it is held constant over an agreed period of time stated in the lease agreement. This time period

may be one year or several years. Although the amount of rent paid by the nursing center may change after the lease expires, the rent is constant during the lease period.

### **Variable Costs**

Variable costs are volume dependent and increase with an increase in patient volume. Chart supplies and disposable supplies are examples of variable costs. As a nursing center increases its patient load, more charts are needed and the amount of money the nursing center spends for charts increases.

### **Marginal Costs**

Marginal costs are also known as incremental costs and are the additional costs associated with the production of the last unit. Marginal costs are calculated by dividing the change in total costs by the change in quantity produced. As output increases, total costs increase. Marginal costs measure this increase only at the margin (Nicholson, 1994).

### **Opportunity Costs**

Opportunity cost is a concept from economic theory which focuses on the allocation of scarce resources and their alternative uses (Finkler, 1995 ). The opportunity cost for an item is the value of the next best use of the resources used in the production of that item (Nicholson, 1994). The concept of opportunity costs states that there is a reciprocal relationship between costs and benefits. Not incurring a cost is the same as getting a benefit and not obtaining a benefit is the same as incurring a cost (Frank, 1994).

An example may help to illustrate the concept of opportunity costs. The director of a nursing center decides to hire an advanced practice nurse with management skills to oversee the daily operation of the center. The director must invest time and other resources in locating suitable candidates. The time involved in writing advertisements, reviewing resumes, and interviewing candidates is time the director is not available to perform other activities. Therefore, there is an opportunity cost associated with hiring the advanced practice nurse.

### **Gross Cost Estimation**

The majority of the cost studies cited in chapter three utilized gross cost estimation methods. In this method, a cost per patient or cost per visit is determined by calculating the total costs of production and dividing this figure by the total number of patients or patient visits produced. Gross cost estimation uses aggregate data to determine cost estimates for units of input and output (Luce et al., 1996). For example, a nursing center might divide the total salary cost of advanced practice nurses by the total number of patient visits to determine the salary cost per visit. If the nursing center defines its product as the total number of patient visits, then gross costing techniques are appropriate for analyzing the production costs.

According to Luce et al. (1996), the advantages of gross costing are simplicity and practicality. Gross costing can also be robust to geographic or institutional variations. However, when using aggregate methods for costing, the details and nuances that may contribute to cost variations are lost.

### **Micro-costing**

Micro-costing is useful when analyzing more than one product and requires a detailed inventory and measurement of resources consumed (Luce et al., 1996). Methods for activities-based costing, an advanced micro-costing technique, have become more commonplace (West, Hicks, Balas, & West, 1996). The purpose of activity-based costing is to improve accuracy in estimating the resources consumed in producing a product by avoiding arbitrary allocations when collecting cost data (Finkler, 1994). In this costing method, total indirect costs are categorized into cost pools representing various resources and activities associated with those resources are identified. These activities are known as cost or activity drivers (West et al., 1996 ).

An example would be the time an advanced practice nurse spends performing different activities. The time necessary for an advanced practice nurse to produce a primary care visit may be substantially different than the time required by the advanced practice nurse to produce a visit for health education. In each case, the cost of production will be affected by the amount of time and the input cost of advanced practice nursing. Utilization differences of other inputs will also affect the production costs for each product.

### **Accounting and Economic Costs**

Accounting cost is interpreted as the concept that goods or services cost only what was paid “out-of-pocket” for them. For durable goods, these costs consider the historical purchase price of the item minus a depreciation rate which is determined from a standard formula (Nicholson, 1994). Economic costs is the concept that goods or services cost the

amount necessary to keep them in their present use or the resale value of the goods or services. This is similar in concept to opportunity costs and these terms are often used interchangeably (Nicholson, 1994).

### **Cost Analysis**

The first phase in conducting a cost analysis is to classify the component costs. There are three essential elements of a good classification scheme: the classes must be relevant to the situation, the categories should be distinct and not overlap, and the classes must cover all possibilities (Creese & Parker, 1994). The most widely used classification system is to categorize inputs based on similar characteristics. Using this method, all inputs for staffing would be placed in one category and inputs for supplies would be in another category. Categorization by similar characteristics was employed in this study for the gross costing methodology.

Inputs can also be classified based on the function or activity for which the resources are used. Resources that are shared by activities must be allocated so that each activity is charged only for its appropriate share (Creese & Parker, 1994). When performing activity-based costing methodology, data will be categorized based on the corresponding activity.

Once all inputs are identified and categorized, a dollar value must be assigned. This is known as “costing out” the inputs. In most instances, market prices yield a reasonable estimate of opportunity costs (Luce et al., 1996). In determining a fair market value for a volunteer receptionist, one might use the prevailing wage for medical receptionists in the community as a reasonable estimate. Each input must be costed out to

the nearest penny and not rounded to the nearest dollar amount until all costs have been added together (Creese & Parker, 1994). Rounding only when all costs can be added together helps to diminish rounding errors.

When determining costs for capital goods, inputs that last longer than one year, one must first identify all capital goods that were used within the year preceding the cost analysis. Once these goods have been identified, the current cost of replacement must be determined and the annual rate of depreciation can be calculated. Another method is to determine the economic cost of capital. To calculate the annualized cost of capital the current value or replacement cost of the capital item must be determined. Then the number of years of useful life for the equipment will be estimated. Using a discount rate and years of useful life an annualization factor can be obtained from a standard table. To determine the annual economic cost divide the current value of the equipment by the annualization factor. Because of the up front investment of funds to purchase equipment, the economic costs are often higher than are the accounting costs (Creese & Parker, 1994). Because this study focuses on economic issues for nursing centers, the economic cost of capital will be used.

Labor costs must also be determined. The cost of labor can be calculated by assuming all labor inputs earn an hourly wage. It is also assumed that the rate paid to workers is consistent with the prevailing community rate for the same categories of employee (Nicholson, 1994). If an advanced practice nurse in a nursing center is paid an annual salary of \$45,000, the hourly rate would be \$22.50. This figure should represent approximately what the advanced practice nurse would earn elsewhere.

According to Creese and Parker (1994), donated goods and services should be valued using economic or opportunity costs and should be included in the cost analysis. All donated goods and services will be valued and included in the cost analysis.

Once all costs are identified and valued, they will then be summed to obtain the total cost. If using a gross-costing methodology, the total costs can then be divided by either the total number of patients or the total number of patient visits to obtain a cost per patient or cost per visit ratio (West, et al., 1996 ).

In an activities-based costing methodology, all direct costs are identified, valued, and summed. Indirect costs are identified, valued, and allocated to the corresponding activity, and a summary measure is obtained for each activity. Direct and indirect costs are summed to obtain the total cost which is divided by the total number of patients or visits produced per activity.

The cost ratios obtained in a cost analysis are for a specific point in time and are likely to change with variations in the revenue stream. For instance, suppose a nursing center obtains a managed care contract which will significantly increase the revenue to the nursing center. Because of the increased revenue, the nursing center decides to decrease the time a patient has to wait for an appointment and hires another nurse practitioner. By hiring more staff, the nursing center has increased its cost. Conversely, as revenue decreases, the nursing center will have to reduce its cost and may choose to do this through a reduction in staff.

### **Sources of Cost Data**

Cost data were obtained from a variety of sources. The nursing centers' budgets were useful for examining the appropriate costs and developing cost categories. However, year-end expenditure records were the most accurate source of each organization's cost data and were the data sources for the analysis of each nursing centers' costs. Staff interviews were utilized and were helpful in determining cost data or cost drivers.

### **Process Mapping**

A process map is a visual display of how work actually is accomplished. The mapping process begins with the identification of the job categories involved in the process. Then the process of moving the patient through all of the intervening steps until the patient checks out is sketched. The map shows how all functions are involved as the patient goes through the process. The map reveals all of the critical interfaces and identifies any illogical, missing, or extraneous steps (Rummler, 1995).

Cost is an important aspect of the process (Harrington, 1991). Understanding the costs associated with a process can provide insight into operational inefficiencies. A process map is also useful in determining cycle time, the total length of time required to complete the process. The activities involved in a process can be timed and a total cycle time calculated.

### **Time Studies**

Time studies were performed to acquire accurate activity-based data. A time study is a method for ascertaining the time required by a skilled, competent employee working at a normal pace doing a specific task (Meyers, 1992). Stopwatch time study is the most

common method utilized in time studies. Time studies can be continuous or snapback. In the continuous study, the decimal minute stopwatch continues to run until the study is completed. The researcher reads and records the activity ending time, and the end of one activity is the beginning of the next activity. Then every reading must be subtracted from the previous reading to calculate the activity time (Meyers, 1992).

In the snapback time technique, the researcher reads the watch as each activity ends and immediately snaps the watch back to zero. The watch restarts automatically to time the next activity (Meyers, 1992). Digital watches combine both the continuous and snapback techniques. When the read button is pushed and held, an activity time is displayed. When the researcher releases the button, the continuous time is displayed in a memory window on the watch.

The first step in the study is to break a process into steps or activities. The use of a breakdown by activity facilitates timing, comparison of the times with the times from other activities, and evaluation of the data (Mundel & Danner, 1994). Since each activity is timed separately, the identified activities must be easily detected and have definite end points. The activity should be as descriptive as is possible, be in sequence of occurrence, and be as small as is practical to time (Meyers, 1992).

Time studies are vulnerable to error as workers may alter their behavior upon being observed (Finkler, Knickman, Hendrickson, Lipkin, & Thompson, 1993). Nevertheless, time studies were necessary in order to allocate labor costs for each identified activity in the activity-based costing analysis.

The snapback time study technique, using a digital stopwatch, was employed to record exactly how much time was devoted to each activity. The researcher recorded the elapsed time of each activity performed by workers at the nursing center on the data collection instrument (see Appendix A). If there were any questions about the nature of the activity, the researcher questioned the worker or wrote a detailed comment on the data collection sheet. When the data collection was completed, total time devoted to each activity was calculated.

Since the purpose of a time study is to establish the average time for a single unit of work, the time period for data collection must be representative of a typical work period. Levenson (1982) states that the selected time period should be representative of the agency's work and the duration of the study should be sufficient to give a fair sample of each cost center. A time period of one week was considered to be representative of a typical work period. Since both sites provide student health services, there may be seasonal variations in the work load. Therefore the time study was conducted during Fall term when the majority of students could be expected to be attending classes. The data were examined for distribution and measures of central tendency and dispersion were obtained.

### **Analysis**

Descriptive statistics and frequency distributions were computed to examine the time study data for distribution and dispersion. Means, standard deviations, medians, ranges, and outliers were examined. Time study data were summed by process and job category. All statistics were computed using Excel.

Data from year end financial statements from each of the nursing center's were entered into Excel and expense reports were generated. The same costing model was used to produce an expense report for each of the nursing centers. Costs were summed and cost per visit ratios were calculated.

### **Sample**

Purposive sampling technique was used for the time study. In this sampling method, the researcher used knowledge about the population and its elements to select cases to be included in the sample (Polit & Hungler, 1995). Patient visits at each of the two nursing centers comprised the population of interest.

The previous fiscal year's patient utilization data contained information about the frequency of injections, procedures, on-site and off-site laboratory studies, the number of new patients seen, and the total number of patient visits. Based on these statistics, the researcher observed patient visits until a representative sample was obtained. Inclusion criteria were that there was a complete observation time for each of the steps in the patient visit (see Appendix A). Any visit with missing observations was excluded from the analysis. Missing observations accounted for approximately 12 percent of total observations.

### **Informed Consent**

Informed consent for the time studies was obtained from nursing center staff and measures were taken to ensure confidentiality. There was a written consent form for those who agreed to participate in the time study. Approval from the institutional review

board of the University of Michigan was obtained prior to data collection. Appendix B is the consent form for the time study.

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## **CHAPTER VII**

### **A COMPARISON OF COSTS AT TWO ACADEMIC-BASED NURSING CENTERS**

In this chapter the results of the cost analyses are presented. First, the costing model is discussed and gross costing results are presented for both the University of Michigan North Campus Family Health Services (NCFHS) and the University of Texas Health Services Center (UTHSC). Then the activities-based costing results are presented for both sites. Time study results are discussed in the activities-based costing section.

#### **Costing Model**

Since each nursing center used different formats for their income and expense reports, a costing model was developed to provide a method for systematically analyzing the costs at the two nursing centers. In the model, costs were categorized by similar characteristics into 4 classes: space lease, contract services, operating expenses, and salaries and benefits. These categories met the criteria of being relevant to the situation, distinct, and covered all possibilities (Creese & Parker, 1994). Using this method, all inputs for staffing were placed in one category and inputs for supplies were placed in another category.

All costs paid for renting the physical space for the nursing centers were placed in the space lease category. At both sites, utilities other than telephone were included in the space leasing fees.

Costs associated with contracting with another agency or company to provide services to the nursing center's patients were placed in the contract service category. At UTHSC, these services included contracts with clinical laboratories for evaluating blood or other bodily fluids and diagnostic imaging companies. The clinic contracted with these providers to receive a discounted rate for the tests and in turn agreed to send their patients to that particular company. These services are patient dependent and will vary with fluctuations in patient volume. NCFHS did not contract for these services. NCFHS referred patients to the University of Michigan Health Care System for laboratory and diagnostic imaging services and the University billed the patient directly.

The operating expense category is broad and includes many items necessary for the daily operations of a clinic. These items include office supplies such as charts and paper and professional supplies such as immunizations. Other items included in this category are: telephone, postage, marketing, capital equipment, security services, insurance, travel reimbursement, maintenance and repair expenses, and reserve funds. Both nursing centers reported expenses for office supplies, professional supplies, telephone, and postage. Other items were site dependent. Expense reports for UTHSC included expense objects for travel, capital equipment, and reserve funds while the reports for NCFHS did not include these items.

All inputs for nursing center personnel were placed in the salary and benefit category. The personnel included administrative personnel, support staff, professional personnel, and research assistants. The inputs included salary, payments for overtime

work, and benefits such as retirement and health insurance. Retainer costs for the physician consultant were also placed in this category.

### **Gross Cost Analysis of North Campus Nursing Center**

Cost analyses can be done from several different perspectives and the costs included in the analyses will vary depending on the chosen perspective. The following cost analysis of the North Campus Nursing Center examines costs from two perspectives: first, from the perspective of the nursing center and then from the perspective of the nursing school. Since the nursing school subsidizes some of the costs incurred by the nursing center, changing the perspective yields different cost structures and cost per patient ratios.

#### **Costs From The Perspective Of The North Campus Nursing Center**

Financial data for the North Campus Nursing Center were obtained from income and expense records for fiscal year 1997, September 1, 1996 to August 31, 1997. The year end, reconciled statement, the most accurate and complete accounting of expenditures, was used for analyzing income and expense data for the nursing center. First, all expenses reported on the year-end statement were categorized according to the cost model previously described. All moneys paid to personnel were categorized as salaries and benefits. All costs reported in the text have been rounded to the nearest whole dollar.

Rent was placed in the space lease category. The North Campus Nursing Center rents space from Family Housing of the University of Michigan. Since the rent is

subsidized by Family Housing, the nursing center paid only \$2,914 or 2 percent of total expenses.

Included in the contract services category are expenses for laboratory, radiology, and other diagnostic testing which are incurred by contracting with a laboratory or diagnostic imaging company. The North Campus Nursing Center did not incur any expenses under the contract service category.

The category of operating expenses included office supplies, professional supplies, telephone, postage, and marketing expenditures. A cost for breast pumps was included in the University of Michigan year end report as professional supplies expense. The NCFHS sells these pumps and the cost of the pumps was completely offset by the income. The breast pumps were considered to be a pass through expense and were, therefore, excluded from the analysis. Total operating expenditures became \$12,488 or 8 percent of total expenses.

The salary and benefit category included all salaries and benefits for direct patient care providers, consultant, office manager, other administrative and research personnel. Total salary and benefit expenditures for all personnel were \$149,317 or 91 percent of total expenses.

Subtotals were calculated for each of the categories and a total for all expenses was calculated. Total expenses for the nursing center were \$164,719.

Some items reported in the year end statement were actually paid for or subsidized by either the University of Michigan School of Nursing or by the Family Housing Department of the University of Michigan. In order to determine costs from the

perspective of the nursing center, an expense report for the nursing center was constructed which excluded items paid for by the nursing school. Since the nursing school paid for salaries and benefits for the nursing center director and the graduate student research assistant and security services, these costs were excluded from the expense report constructed from the nursing center perspective.

For fiscal year 1997, the North Campus Nursing Center reported 1895 primary care patient encounters and an additional 3178 Women Infant and Children (WIC) program encounters for a total of 5073 encounters. In traditional gross costing methodology, total expenses are divided by the number of patient visits to obtain a cost per patient ratio. Using this method, the cost per encounter for the North Campus Nursing Center was \$32 per encounter when the analysis was conducted from the perspective of the nursing center.

#### **University of Michigan School of Nursing Perspective on Costs**

Next, expenses were examined from the broader perspective of the University of Michigan School of Nursing. In this perspective, all expenses reported in the year-end statement were included. In addition, 25 percent of the yearly salary paid by the school of nursing to the nursing center's director was included in the salary and benefit category. The director is a full-time employee of the school of nursing and 25 percent of that appointment is as the director of the nursing center. Benefits at the University of Michigan are 25.5 percent of salary (Gayle Aseltine, Administrative Assistant, personal communication, January 8, 1998). This percentage was used to calculate benefits for the director of the nursing center. Although the nursing center director has a full-time

appointment and the School of Nursing would incur the salary and benefit expense even if the nursing center did not exist, an opportunity cost was incurred by the nursing school for the 25 percent of the faculty position allocated to the nursing center. During the time this faculty member spent working at nursing center activities, she was not available to perform teaching or other faculty activities at the nursing school. Therefore, this cost was included as an expense to the nursing school.

Tuition and stipend expenses for the graduate student research assistant were also included as costs. The graduate student performed research activities for the nursing center and these expenses were paid for by the school of nursing.

Salaries and benefits from the school of nursing perspective were \$181,508 or 87 percent of total expenses. This is an increase of 22 percent over salaries and benefits viewed from the narrower nursing center perspective which did not include compensation for the nursing center director or for the graduate student research assistant.

The nursing center paid a subsidized annualized lease of \$2,914 for the three apartments the center occupied. The rental fee includes heat, gas, and water. If Family Housing no longer subsidized the rent, either the nursing center or the school of nursing would need to pay the unsubsidized rate. Family Housing has different rental rates for students and faculty. The student rates had greater subsidies than did the faculty rates. Since the faculty rate better approximated an unsubsidized rate, it was used to calculate the opportunity costs to the school of nursing. The actual rate for an equivalent space would be \$15,222 annualized. WIC shared space with the primary care clinic for seven months and then moved into its own apartment. Space rental was calculated by

multiplying the monthly rent Family Housing would charge a faculty member for these two apartments by 12 months and multiplying the additional rent by 5 months and summing the amounts. From the perspective of the nursing school, the rental rate increased from 2 percent to 7 percent of total expenses.

Next, a fair market value for the equivalent square footage was obtained. A fair market value for medical office space in the North Campus area is \$12 to \$15 per square foot per year (Lori Blair, Anderson Associates, personal communication, Jan 16, 1998). Utilities are not included in this rate. Assuming the school of nursing would want to lease the least expensive site, a value of \$12 per square foot was used to calculate the fair market value of \$16,440 or 8 percent of total expenses.

For purposes of this cost analysis, it was assumed that NCFHS would prefer to lease space in North Campus Family Housing. Therefore, the annualized, unsubsidized rate of \$15,222 was used for the space lease expense throughout the cost analysis.

From the perspective of the school of nursing, there was an additional operating expense of \$575 for security services at the nursing center. Total operating expenses were \$13,063 or 6 percent of total expenses. Total expenses were \$209,793 and the average cost per encounter was \$41. The per encounter average cost increased by \$9 per encounter when viewed from the perspective of the school of nursing. A comparison of expenses from each of the perspectives is presented in Table 7. The remainder of the cost analysis proceeds from the perspective of the nursing school.

Table 7

**Comparison of Total Costs at North Campus Family Health Center from Two Perspectives**

Expense Object	NCFHS	% of Total Expenses	University of Michigan Nursing School	% of Total Expenses
<b>Contract Services</b>	-	<b>0%</b>	-	<b>0%</b>
<b>Space Lease</b>	<b>2,914</b>	<b>2%</b>	<b>15,222</b>	<b>7%</b>
<b>Operating Expenses</b>	<b>12,488</b>	<b>8%</b>	<b>13,063</b>	<b>6%</b>
Office Supplies	3,977	2%	3,977	2%
Professional Supplies	6,133	4%	6,133	4%
Postage	320	0%	320	0%
Marketing	-	0%	-	0%
Telephone	2,058	1%	2,058	1%
Security Services	-	0%	575	0%
<b>Salaries &amp; Benefits</b>	<b>149,317</b>	<b>91%</b>	<b>181,508</b>	<b>87%</b>
Staff Salaries	112,740	68%	112,740	68%
Consultant	7,841	5%	7,841	5%
Benefits	28,736	17%	28,736	17%
Director	-	0%	20,987	5%
Graduate Student Research Assistant	-	0%	11,204	5%
<b>Total Expenses</b>	<b>164,719</b>	<b>100%</b>	<b>209,793</b>	<b>100%</b>
<b>Total Number of Encounters</b>	<b>5,073</b>		<b>5,073</b>	
<b>Cost per encounter</b>	<b>32</b>		<b>41</b>	
<b>Revenue per encounter</b>	<b>27</b>		<b>27</b>	

**Fixed Costs**

Next, costs were classified as being either fixed or variable. Fixed costs are those that do not vary with a change in the number of patient visits or the number of services provided. Rent for the nursing center's physical space, security services, and equipment are all fixed costs in the short run. In this analysis, the short run was defined as one fiscal year.

The amount paid for space rental was set and did not vary over the course of the fiscal year. Of the operating expenses, only security services were considered to be fixed. Security services, because they must be provided during the entire time the clinic is open, do not vary with patient volume. All other operating expenses would vary with changes in patient volume and were, therefore, classified as variable expenses.

Cost for labor can be fixed or variable. If labor does not vary with changes in patient volume it is a fixed cost. According to a conventional rule of accounting, if labor did not vary with either a doubling or halving of patient volume it would be a fixed expense. The office manager would be an example as this position is full-time and would not vary if the center either doubled or halved the current number of patients seen. The director of the nursing center was also classified as being a fixed cost as the needed labor would not change by either halving or doubling the current number of patients seen. Other labor classified as a fixed cost were accounting, graduated student research assistants, and the nursing center's co-director.

Labor for direct patient care providers, such as the nurse practitioner and the clerk, are dependent on patient volume. If the number of patient encounters were to double,

more clerk, dietitian, and nurse practitioner time would be needed. Labor costs for work study personnel were also classified as variable costs. Total fixed costs for NCFHS were \$112,670.

### **Variable Costs**

Variable costs are volume dependent and increase with an increase in patient volume. Chart supplies and disposable supplies are examples of variable costs. As a nursing center increases its patient load, more charts would be needed and the amount of money the nursing center spends for charts would increase. Except for security services, all other operating expenses were classified as variable costs. As previously discussed, all labor expenses for direct patient care providers were classified as variable costs. Total variable costs for NCFHS were \$97,123.

Once all costs were classified as fixed or variable, a cost per encounter for both fixed and variable costs was calculated. The fixed cost per encounter was \$22 and the variable cost per encounter was \$19.

### **Revenue**

Revenue was defined as those funds generated by producing a patient encounter. Direct patient payment, insurance reimbursement, and managed care contracts were all classified as revenue. Other income such as grants and gifts were excluded from the category of revenue. These exclusions were revenue from the sale of the breast pumps and \$48,357 in grants and gifts to the nursing center. Grant funds and gifts accounted for

\$10 per encounter. The largest grant, accounted for 88 percent of total grant funds, was ending in fiscal year 1998.

Total revenue for fiscal year 1997 was \$138,936. The revenue per encounter was \$27 for a loss of \$14 encounter. This is sufficient to cover average variable costs and make some contribution toward the fixed costs.

### **Marginal Cost and Marginal Revenue**

Marginal costs are the additional costs associated with the production of the last unit and are calculated by dividing the change in total costs by the change in quantity produced. Calculations for marginal costs are most valuable when monthly changes in costs and quantity can be used. Since only yearly data were available for both NCFHS and UTHSC, marginal cost and revenue were not calculated.

### **University of Texas Health Services Center**

The same gross costing methodology was used to analyze costs at the University of Texas Health Services Center (UTHSC). Financial data were obtained from year-end income and expense statements for fiscal year 1997, September 1, 1996 to August 31, 1997. The center has two income and expense accounts, one for services provided to students and employees and another account for private patients and managed care contracts. Expense data from each of these accounts were placed into one income and expense statement using the model of contract services, space rental, operating costs, and salaries and benefits (see Table 8).

The University of Texas Health Services is self-supporting. The center is not financially supported or subsidized by the University of Texas School of Nursing and the center does not utilize any volunteer labor. Therefore, the costs from the perspective of the nursing center and the nursing school are identical.

All moneys paid to staff and faculty were categorized as salaries and benefits. This category accounted for \$403,730 or 62 percent of the total expenses for the nursing center. Unlike the North Campus Nursing Center, the Texas nursing center does not utilize volunteer personnel and the University of Texas Nursing School does not subsidize any salaries. A physician provides consultation in exchange for use of the clinic facilities for his part time practice.

The category of operating expenses included consumable supplies, maintenance and repair, telephone, postage, coping service charges, capital equipment, travel reimbursement, insurance, and reserve funds. Total expenditures for this category were \$138,371 or 21 percent of the total expenditures.

Rent was placed in the space rental category. The UTHSC rents office space from the University of Texas at a fair market rate of \$28 per square foot including utilities. Rental expenses were \$113,047 or 17 percent of total expenses.

Contract services include expenses for laboratory and diagnostic imaging services. The UTHSC contracts with a private company to provide laboratory services to the nursing center's patients. The clinic also contracts with a private diagnostic imaging

Table 2

Financial Summary for University of Texas Health Services Center

Expense Object	Annual Expenditure	% of Total Costs
<b>Contract Services</b>	-	
<b>Space Lease</b>	<b>113,047</b>	<b>17%</b>
<b>Operating Expenses</b>	<b>138,371</b>	<b>21%</b>
Other Operating Expenses	50,766	8%
Consumable Supplies	30,954	5%
Capital Equipment	11,149	2%
Telephone	6,334	1%
Maintenance & Repair	1,464	0%
Postage	2,533	0%
Copy Service Charges	3,039	0%
Domestic Travel	14,128	2%
State Reserve Fund	15,887	2%
Insurance	1,853	0%
Records Retrieval	184	0%
<b>Salary &amp; Benefits</b>	<b>403,730</b>	<b>62%</b>
Staff/Faculty Salaries & Benefits	365,705	57%
Additional Benefits	38,025	4%
<b>Total Expenses</b>	<b>655,067</b>	<b>100%</b>
<b>Total Number of Encounters</b>	<b>14,708</b>	
<b>Cost per encounter</b>	<b>45</b>	
<b>Revenue per encounter</b>	<b>60</b>	

company to provide x-rays and other outpatient diagnostic imaging services to patients.

Total expenses for this category were \$ 93,419 or 12 percent of the total expenses.

UTHSC bills patients for these charges and includes a mark up making this a pass through expense. The cost for contract services was excluded from the analysis and this amount was subtracted from total revenues.

Subtotals were calculated for each of the categories and a total for all expenses was calculated. Total expenses for the UTHSC were \$655,067. The total cost per encounter was \$45.

### **Fixed Costs**

Next, costs were classified as being either fixed or variable. As with the NCFHS, fixed costs were identified as rent for the physical space, salaries and benefits for administrative personnel, and capital equipment. In addition, insurance and reimbursement for domestic travel were also deemed to be fixed expenses in the short run. All other operating expenses would vary with changes in patient volume. Total fixed costs were \$258,304 and accounted for 35 percent of total costs.

The largest expense categories for fixed costs were space lease and salaries and benefits. The expense for space lease was 17 percent of total fixed costs and salaries and benefits was 18 percent. Fixed labor costs were the office manager, research assistant, and the half-time nurse administrator.

**Variable Costs**

Variable costs are volume dependent. Telephone, postage, and consumable supplies vary with changes in patient volume. Labor made up the single largest category and accounted for 44 percent of variable expenses. Total costs for variable labor was \$285,603. Variable costs totaled \$396,763 or 61 percent of total costs.

**Cost Summary**

Once all costs were classified as either fixed or variable, a cost per encounter for both fixed and variable costs was calculated. The fixed cost per encounter was \$18, the variable cost per encounter was \$27, and the total cost per encounter was \$45.

**Revenue**

As in the case of NCFHS, revenue was defined as those funds generated by producing a patient encounter. Direct patient payment, insurance reimbursement, and managed care contracts were all classified as revenue. Total revenue for fiscal year 1997 was \$972,778. When the revenue from contract services is excluded, the adjusted revenue was \$879,359 and the adjusted revenue per encounter was \$60 or \$15 more per encounter than it cost.

**Comparison of Gross Costs for the Two Nursing Centers**

The following comparison of the two nursing centers was done utilizing the broader perspective of the University of Michigan School of Nursing to analyze costs. Since the UTHSC is self-sufficient, costs from the perspective of the nursing center and

the nursing school were the same. This is not the case at the NCFHS. The University of Michigan School of Nursing incurs opportunity and accounting costs in operating the nursing center. Therefore, the broader University of Michigan School of Nursing perspective was the most useful for comparing costs between the two nursing centers.

The nursing centers are located in very different areas of their communities. The UTHSC is situated in a high rise building in the medical center area of downtown Houston, Texas. Many hospitals, other clinics, and several university health science campuses are within a few blocks of the nursing center. The University of Texas owns the building in which the nursing center is located and other employee services are also located within this building. The nursing center has a soundproof room for audiometry and a lavatory equipped with special water shut off valves required for drug screen testing. UTHSC paid an annualized rate of \$28 per square foot which included utilities.

The NCFHS is located within a two story housing unit owned by the University of Michigan. The area is comprised of apartments owned and operated by the University of Michigan to provide affordable housing for students with families. In the immediate area are several strip malls and office complexes. NCFHS paid an annualized rate of \$12 per square foot including utilities for clinic space or slightly less than half of the rate paid by UTHSC.

In the category of contract services, UTHSC had an expense of \$93,419 while NCFHS did not incur expenses for this category. UTHSC contracts with a private company for laboratory services. As part of their services, the laboratory provides a centrifuge, collection tubes, syringes, needles, and slides and test results are faxed to the

clinic. UTHSC provides the other necessary supplies for collecting laboratory specimens. The laboratory bills the nursing center at their cost plus a mark up for their services in performing the tests. The nursing center charges the patient or insurer directly and adds on a processing fee for each laboratory test. UTHSC has a similar arrangement with a diagnostic imaging service located near the nursing center. This company bills the nursing center directly for their services and the nursing center adds a processing fee and charges the patient. As previously stated, this was a pass through cost and was excluded from the analysis.

NCFHS did not have arrangements for laboratory contract services. The University of Michigan Medical Center laboratory provides equipment similar to that provided to UTHSC but the laboratory bills the patient directly. The nursing center charged a small drawing fee for blood specimens but did not add a processing fee. Diagnostic imaging is performed at one of the University of Michigan sites and the patient is billed directly by the Medical Center. While NCFHS did not incur billing expenses or bad debt they also did not enjoy service fees from laboratory tests.

Operating expenses were 6 percent of total expenses for NCFHS and 21 percent of the total expenses at UTHSC. Although both sites incurred expenses for similar items such as office supplies, operating expenses for UTHSC contained several items not included in the expense reports for NCFHS. These items included \$11,149 for capital equipment, \$14,128 for travel, and \$15,887 for reserve funds for a total of \$41,164. When these items are removed from operating expenses, total operating expenses decrease to 16 percent of total expenses which is still 10 percent greater than at NCFHS. Perhaps

due to its consistent operating deficit, NCFHS did not purchase any capital equipment or have a reserve fund for major expenses in the future. Reserve funds are required by the State of Texas but are not required in Michigan.

Salaries and benefits accounted for the majority of expenses at both nursing centers. At NCFHS salaries and benefits were 87 percent of overall expenses while at UTHSC salaries and benefits were only 62 percent of total expenses. At NCFHS, direct patient care is provided by one nurse practitioner and one clerk. Hourly rates were calculated for these employees by summing the amounts for salaries and benefits and dividing this by 1,560 hours for the work year. The University of Michigan assumes the full-time work year to contain 2,080 hours. The nurse practitioner and the clerk are employed at the nursing center for 30 hours a week or 75 percent of a full-time appointment which is 1,560 hours. Hourly rates for the nurse practitioner and clerk were \$36 and \$11 respectively.

At UTHSC, direct patient care is provided by 2.5 nurse practitioner FTE's, 2 clerks, and 3 licensed vocational nurses (LVN). Hourly rates for these work categories were calculated by summing salaries and benefits for each category and dividing by 2080 hours which is the number of hours for a full-time work year at the University of Texas. The mean hourly rate for nurse practitioners at UTHSC was \$40 which is \$4 more per hour than at NCFHS.

The mean hourly rate for the LVN category was \$14. There is no LVN or equivalent category at NCFHS. These activities are performed by the nurse practitioner. At UTHSC the mean hourly rate for clerks was \$12 which is \$1 per hour more than at

NCFHS. Although the costs for nurse practitioner labor is greater at UTHSC, this is offset by the use of less expensive personnel. That is, using LVNs to deliver some patient care lowers the overall cost of labor. The mean hourly rate for patient care providers, nurse practitioners, LVNs, and clerks, at UTHSC was \$23 per hour. The mean hourly rate at NCFHS for the nurse practitioner and clerk was \$24.

### **Fixed and Variable Costs**

Total fixed costs at NCFHS were \$112,670 with a fixed cost per encounter of \$22 and at UTHSC fixed costs were \$258,304 with a fixed cost per encounter of \$18. The UTHSC and NCFHS had several differences in their fixed cost structures. Space lease was very different at the two nursing centers. UTHSC paid twice the amount per square foot for rent than did NCFHS. Space rental accounted for 17 percent of total expenses for UTHSC but only 7 percent of expenses at NCFHS. Domestic travel expenses were also included as fixed expenses for UTHSC. These expenses accounted for 2 percent of overall costs and were not expenses incurred by NCFHS.

However, fixed costs were only 39 percent of total expenses at UTHSC but accounted for 53 percent of expenses at NCFHS. The cost of fixed labor at each of the two sites helped to explain the greater percentage of fixed costs incurred by NCFHS. Forty five percent of fixed costs at NCFHS were for labor with a total labor fixed cost of \$96,873. This is a fixed cost of labor of \$19 per encounter. At the UTHSC, the total of fixed labor was \$118,127 for a fixed cost of labor of \$8 per encounter. The administrative overhead was significantly greater at NCFHS than at UTHSC and was the major contributing factor to the fixed costs at NCFHS.

Variable costs per encounter at the two nursing centers were quite different but in this case the cost at UTHSC was greater. At UTHSC the variable cost per encounter was \$27 which was considerably higher than the \$19 variable cost per encounter sustained by NCFHS. Fixed and variable costs are summarized in Table 9.

At NCFHS, professional supplies were also a small percentage of total expenses, 3 percent, but accounted for 47 percent of all operating expenses. The NCFHS did not have a class D pharmacy but did purchase some medications, generally immunizations, from the University of Michigan pharmacy. This expense accounted for 43 percent of consumable supplies.

The variable cost of labor was similar at the two nursing centers. Total variable labor at UTHSC was \$285,604 for a variable labor cost per encounter of \$19. At NCFHS variable labor cost per encounter was \$17 with a total variable labor expense of \$84,635.

Overall, the UTHSC had higher total costs per patient encounter than did the NCFHS. Total cost per encounter at UTHSC was \$45 and total cost per encounter at NCFHS was \$41. However, UTHSC had lower fixed costs per encounter than did NCFHS and NCFHS incurred significantly higher administrative overhead costs.

### **Nursing Center Revenues**

Revenue was defined as funds generated by producing a patient encounter. Direct patient payment, insurance reimbursement, managed care contracts such as the Women, Infants, and Children (WIC) program, and moneys obtained from class fees were all considered to be revenue. Grant moneys and donations were classified as other money and excluded from the analysis of revenue.

Table 9

Comparison of Fixed and Variable Costs at North Campus Family Health Services and University of Texas Health Services Center

Expense Object	North Campus Family Health Center	University of Texas Health Services Center
<b>Fixed Expenses</b>	<b>112,670</b>	<b>258,304</b>
Space Lease	15,222	113,047
Security	575	0
Insurance	0	1853
Travel	0	14,128
Capital Equipment	0	11,149
Salaries and Benefits	96,873	118,127
<b>Fixed Cost per Encounter</b>	<b>22</b>	<b>18</b>
<b>Variable Costs</b>	<b>97,123</b>	<b>396,763</b>
Contract Services	-	-
Operating Costs	12488	111,160
Office Supplies	3,977	3,039
Postage	320	2,533
Telephone	2,058	6,334
Maintenance & Repair	0	1,464
Professional Supplies	6,133	30,954
Other	0	\$50,766
State Reserves	0	15,887
Record Retrieval	0	\$184
Salaries and Benefits	84,635	285,604
<b>Variable Cost per Encounter</b>	<b>19</b>	<b>27</b>
<b>Total Expenses</b>	<b>209,793</b>	<b>655,067</b>

NCFHS generated total revenues of \$136,671 for the fiscal year 1997. When the revenue from the sale of breast pumps was excluded, the total adjusted revenue was \$134,406 for a revenue per encounter of \$27. Since NCFHS generated an average of \$27 per encounter but spent an average of \$41 per encounter, the center lost \$14 on every patient encounter. The nursing center's revenues only covered 63 percent of their total costs.

NCFHS could become more profitable by increasing the number of patient encounters as long as the revenue per encounter remained greater than the variable cost per encounter and fixed costs did not increase. Decreasing fixed costs and increasing the revenue per encounter would also improve profitability. Of these strategies, decreasing fixed costs is the most feasible as costs are under the control of the nursing center. The other two strategies are dependent on patient demand or third-party reimbursement policies.

Total revenues for UTHSC were \$972,784. When the revenue from repayment of contract services was excluded, the adjusted revenue was \$879,359. This was an average revenue per encounter of \$60 or \$15 more per encounter than the total cost per encounter. UTHSC had a profit margin of 25 percent.

### **Activities-Based Costing**

Activities-based costing is a micro-costing technique used for improving accuracy in estimating the resources consumed in producing a product by avoiding arbitrary cost data allocations (West, Hicks, Balas, & West, 1996). In this approach, organizations are

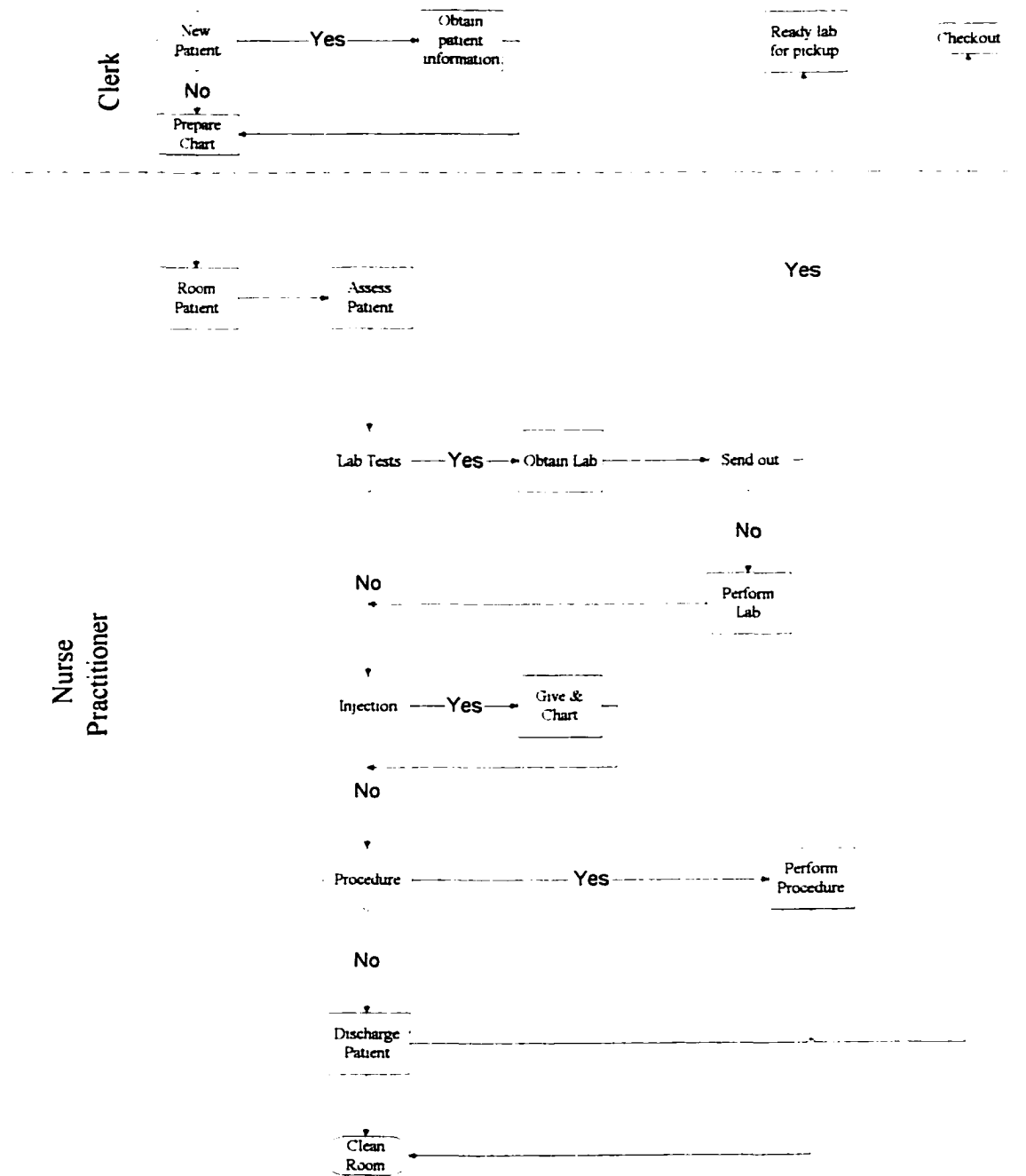
divided into activities that describe the way time is spent in the firm and the outputs of the process (Brimson, 1991).

One technique used in determining the appropriate activities is process mapping. A process is the series of steps by which a firm turns inputs into outputs (Rummler, 1995). A process map is a visual display of these steps.

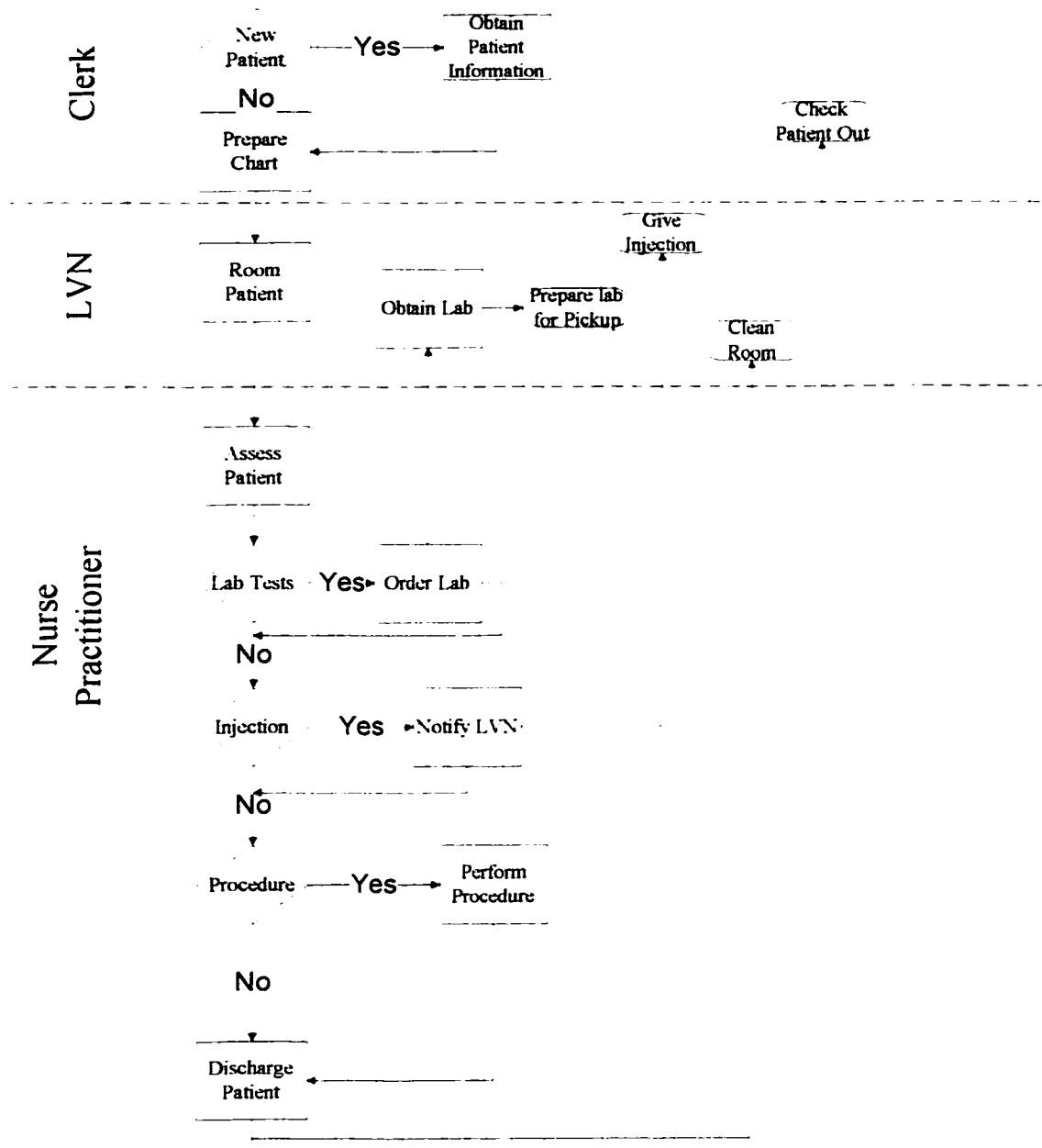
Based on information from administrators, providers, and this researcher's many years of out-patient clinical experience, process maps were generated for both nursing centers. After the preliminary maps were drawn they were reviewed by the directors of each of the nursing centers and by one nurse practitioner from each site. In accordance with feedback from these experts, the process maps were revised. Additional revisions were made based on direct observation by the researcher of each nursing center's clinical operations. Figures 1 and 2 depict process maps for the two nursing centers.

The same four category cost model used in the gross costing section was used in the activities-based costing section. The categories were contract services, space rental, operating expenses, and salaries and benefits.

Time studies were performed to acquire accurate activity-based data. Time study data collection followed the processes outlined in the process maps. Results from these time study data were then used to develop activities-based costing data. Year end expense reports also served as data sources for the activities-based costing. The time study data collection instrument is shown in Appendix A.



**Figure 1. Process Map for North Campus Primary Care Clinic**



**Figure 2.** Process Map for University of Texas Health Sciences Center primary health care

**North Campus Family Health Center**

NCFHS has two distinct activities or product lines; primary health care services and the WIC program. A process map was developed for each of these and a time study was completed for each product line. Using the 1996–1997 year end expense reports for NCFHS, individual expense reports were developed for each product. As in the gross costing section, the perspective taken is that of the University of Michigan School of Nursing.

The standard accounting method for NCFHS is to place all income and expenses for both WIC and the primary care activities into one expense report. In order to perform activities-based costing it was necessary to create individual expense reports for each activity. First, costs associated with only one of these products were placed in separate expense reports. Examples of these costs are salaries and benefits for the nurse practitioner and clerk. These workers are employed solely in the production of the primary care product line. Then expenses associated with both products were allocated based on a percentage of the total costs.

Costs can be allocated by determining the ratio of each product line's number of visits to total encounters. This method was complicated by the difficulty in determining the actual number of encounters conducted by WIC. According to the time studies, WIC employees saw one patient every half hour. Since WIC operated for 12 hours a week for 49 weeks, the total number of encounters should be approximately 1176. The year end statement reported a total of 3178 encounters. WIC was paid by the number of clients enrolled and not by the individual encounter. If the mother went to WIC to pick up food

coupons for herself and her two children, this was considered to be three encounters although only one individual came to the clinic. The data were examined to determine the average number of participants per family but the data did not contain the detail necessary to ascertain this. Because of the difficulty in determining the exact number of encounters performed, allocation was done using a best case-worst case scenario from the perspective of the primary care clinic. Since WIC was in operation 12 hours a week, which is 30 percent of a 40 hour week, the worst case scenario allocated 30 percent of appropriate costs to WIC. The WIC clinic required the services of the office manager who was also required in the primary care clinic. Based on the hours of operation and her primary care clinic duties, it was estimated that 40 percent of her time was spent on WIC activities. Given this estimate, the best case scenario allocated costs to WIC at a rate of 40 percent. Expenses such as office supplies which were used by both activities, were allocated to each product based on their percentage of operating time.

### **Expenses for the WIC Program**

Expenses were analyzed using both the 30 and 40 percent allocation. There was little difference in overall costs or cost per visit. Discussion of WIC expenses follows using the 40 percent allocation; amounts for 30 percent are given in parenthesis.

Currently the WIC program occupies a 441 square foot apartment across a breezeway from the primary health care clinic. The WIC program moved into this space on April 1, 1997. Prior to that time, the WIC program shared space with the primary health care clinic and was open during hours when the primary clinic was not in operation. Family Housing subsidized the rent for the new WIC office space but the actual rate for an

equivalent space would be \$510 per month. WIC occupied this space for 5 months for a rental expense of \$2550. During the time WIC shared space with the primary care clinic the rental rate was 40% of \$7,392 (\$2218). Total rent was for WIC was \$5,506 (\$4,668 at allocation of 30 percent). Utilities were included in the rental rate. The WIC program incurred no expenses for contract services.

In the operating expense category, the WIC program incurred expenses for office supplies, postage, telephone, and security services. It did not incur any expenses for professional supplies. When office supplies, postage, telephone, and security services were allocated at 40 percent total operating expenses for the WIC program were \$2,194 (\$1,645).

In the salaries and benefits category, WIC had some employees who were employed solely for WIC and shared labor of other employees with the primary health care clinic. The dietitian was employed solely by the WIC program while the office manager and nursing center director were shared between WIC and the primary care clinic. When 40 percent of the salary and benefits for the office manager and the director were allocated to the salary and benefits category, total salaries and benefits were \$30,746 (\$24,577).

Based on a 40 percent allocation, total expenses for the WIC program were \$38,447 for a cost per encounter of \$12 (\$30,990) and \$10 respectively. Total revenues for WIC were \$21,290 for a revenue per encounter of \$7. According to this approach, the WIC program sustained an operating loss \$5 per encounter (\$3).

**Expenses for the Primary Health Care Clinic**

Since shared expenses were allocated to WIC at a rate of 40 percent, these expenses were allocated to the primary care clinic at a rate of 60 percent. The costs based on an allocation rate of 30 percent to WIC are shown in parenthesis. Space rental included the unsubsidized fee charged by Family Housing. The primary health care clinic occupies 2 adjoining apartments in a Family Housing complex in the north campus area of the University of Michigan. One apartment is 441 square feet and rented for \$510 per month. The other apartment is 488 square feet and rented for \$546 per month. As in the gross costing section, the monthly rates are the fees Family Housing charges faculty for apartment rentals. Utilities were included in the rent. Seven months of space rental was allocated to the WIC program. Space rental was \$9,715 ( \$10,454).

Expenses for laboratory and radiology are examples of expenses that would be included in the contract services category. The North Campus primary health care clinic did not incur any expenses under the contract service category. As previously mentioned, NCFHS did not have contracts with laboratory or diagnostic imaging companies.

Operating expenses included office supplies, professional supplies, postage, telephone, and security services. All expenses for professional supplies were incurred by the primary health care clinic and totaled \$6,133. Expenses for copying and office supplies from Office Depot and the University of Michigan were shared by WIC and the primary health care clinic and were allocated to the primary care center as previously discussed. All other expenses for office supplies were incurred solely by the primary care clinic. Total operating expenses were \$10,869 (\$11,418).

The office manager and the director of the nursing center were employed by both WIC and the primary health care clinic. Their salaries and benefits were allocated at a rate 40 percent (30 percent). The other employees, nurse practitioner, clerk, accountant, co-director, and research assistant were employed solely in the activities of the primary health care clinic. Expenses for the physician consultant were also incurred solely by the primary health care clinic. Total salary and benefit expenses were \$150,762 (\$156,931). Costs are summarized in Table 10.

Total expenses for the primary health care clinic were \$171,346 (\$178,803). There were a total of 1,895 patient encounters for fiscal year 1997. The cost per encounter ranged from \$90 (\$94). Total revenues for the primary health care clinic were \$117,646. When the revenue from the sale of breast pumps was excluded total adjusted revenue was \$115,381 for a revenue per encounter of \$61. The primary health care clinic sustained a loss of \$29 (\$33) per encounter.

#### **Fixed Costs for WIC and the Primary Health Care Clinic**

As in the gross-costing section, costs were categorized as fixed or variable using the same assumptions and definitions. Space rental and security services were classified as fixed expenses. Since security services were shared between WIC and the primary health care clinic, the expense was allocated between the two product lines using either 30 percent or 40 percent scenario.

Table 10

NCFHS Costs and Revenue by Product Line

Expense Object	WIC at 30%	Primary Care at 70%	WIC at 40%	Primary Care at 60%	Sum
<b>Contract Services</b>	-	-	-	-	-
<b>Space Lease</b>	4,768	10,454	5,506	9,715	15,222
<b>Operating Expenses</b>	1,645	11,418	2,194	10,869	13,063
Office Supplies	759	3,218	1,013	2,964	3,977
Professional Supplies	-	6,133		6,133	6,133
Postage	96	224	128	192	320
Telephone	617	1,441	823	1,235	2,058
Security	172	403	230	345	575
<b>Salaries &amp; Benefits</b>	<b>24,577</b>	<b>156,931</b>	<b>30,746</b>	<b>150,762</b>	<b>181,508</b>
<b>Total Expenses</b>	<b>30,990</b>	<b>178,803</b>	<b>38,447</b>	<b>171,346</b>	<b>209,793</b>
Cost per encounter	10	94	12	90	41
Total Revenue	21,290	115,381	21,290	115,381	138,936
Revenue per encounter	7	62	7	61	27
Net loss per encounter	3	32	5	29	14

The office manager, director, co-director, research assistants, and the accountant were classified as fixed labor expenses. Expenses for the office manager and the director were shared between the two product lines and the expenses were allocated in the same manner as the security services. Labor expenses for the co-director, research assistants, and the accountant were only incurred by the primary health care clinic.

Total fixed costs were for WIC were \$14,132 (\$11,236) for a fixed cost per encounter of \$4. For the primary health care clinic, total fixed costs were \$83,226 (\$89,949) and the fixed cost per encounter was \$44 (\$47).

#### **Variable Costs for WIC and the Primary Health Care Clinic**

Variable expenses included all operating expenses other than the previously mentioned security services and labor costs for direct patient care providers. Total variable costs for WIC were \$24,378 (\$20,059) for a variable cost per encounter of \$8 (\$6). Total variable costs for the primary health care clinic were \$88,058 (\$89,949) for a variable cost per encounter of \$46 (\$47).

The total cost per encounter for WIC was \$12 (\$10) and the revenue per encounter was \$7 resulting in an operating loss. Since the revenue was greater than the variable costs, an increase in the number of patient encounters would decrease fixed costs per encounter and improve profitability as long as there was no increase in fixed costs or decrease in revenue per encounter.

The situation for the primary health care clinic was similar to that of the WIC program. Total costs per encounter ranged from \$90 (\$94). The revenue per encounter was greater than either the fixed or variable costs per encounter but not greater than the

total costs. Since the revenue was greater than the variable expenses, profitability could be improved by increasing the number of patient visits. This would decrease the fixed cost per encounter.

### **Time Studies**

Time studies were performed to acquire accurate activity-based data. The snapback time study technique, using a digital stopwatch, was employed to record exactly how much time was devoted to each activity.

#### **Time Studies of WIC Program**

Employees of the WIC program were timed during a two week period for a total of 19 observations. WIC has two different processes, certification and coupon pickup. These processes differ in the amount of labor required for each process. The certification processes is labor intensive, uses 2 labor categories, and had a mean time of 45 minutes and 19 seconds. It ranged from a low of 30 minutes and 38 seconds to a high of 61 minutes and 50 seconds.

The coupon pickup process required less labor and only one labor category. The mean time for this process was 9 minutes and 9 seconds and ranged from 7 minutes 38 seconds to 10 minutes 58 seconds.

The labor cost for each process was calculated by multiplying the hourly rate with the mean encounter time. Hourly rates were calculated by dividing the employee salary by the actual number of hours employed in each product line during the fiscal year. Total labor cost for the certification process was \$23 and the labor cost for the coupon pickup

process was \$3. These results support the previous conclusion that WIC is sustaining an operating loss but provides insight into where the loss is occurring. Mean labor cost for all visit types was \$15.

WIC is a labor intensive process and labor was the most expensive input, accounting for 80 percent of total costs. Operating costs accounted for only 6 percent of total WIC costs and were only \$0.69 per encounter. Labor was the main cost driver for WIC activities.

The quantity of each type of visit was the same since clients were required to have 2 certification visits and 2 coupon pickup visits. When all other costs were included and were equally divided between the visit types, the total cost for a certification visit was \$27 and the coupon pick-up visit was \$7. Since revenue per encounter was \$7, WIC was losing approximately \$20 on every certification visit and breaking even on every coupon pickup visit.

### **Time Study of the Primary Health Care Clinic**

The time study of the primary health care clinic was conducted over a two week time period during the Fall semester of 1997. There were two different processes, the assessment visit and the procedure visit. Both processes utilized a nurse practitioner and a clerk but required different amounts of labor input.

The assessment visit had 3 variations; an assessment only, an assessment with one additional task, and an assessment with two other tasks. The additional tasks include the following: injections, laboratory tests, or giving out of sample medication. For all types of visits the mean was 28 minutes and 35 seconds (SD = 10 minutes, 40 seconds) and ranged

from a low of 11 minutes and 44 seconds to 1 hour, 34 minutes, and 19 seconds (see Table 11).

Direct labor costs were calculated by multiplying the hourly rate, calculated by dividing the total compensation by the actual number of possible patient contact hours, with the mean visit time. The labor cost for each process was calculated by multiplying the hourly rate by the mean time for each employee category and summing the results.

The primary care clinic had 26 hours per week available for patient visits for 49 weeks of the year for a total of 1274 hours. The average visit took 28 minutes and 35 seconds of which 9 minutes and 12 seconds was clerk time and 19 minutes was nurse practitioner time.

The primary health care processes are labor intensive and labor, direct and indirect, was the cost driver accounting for 88% of total costs for the primary care clinic. Based on the activity-based time study data, the direct labor cost associated with the activity was calculated by summing the product of the activity time and cost of each for each labor category. This direct labor cost was \$18. This cost is hypothetical because it is the cost solely associated with the activity and includes no indirect labor or adjustments for staff utilization.

The actual direct labor cost was calculated by dividing the total direct labor compensation by the number of patient visits. The actual direct labor cost was \$41 per visit. This cost takes into account all activities for direct labor personnel such as cleaning and stocking activities, break times, and excess capacity for patient visits. Direct labor

Table 11

NCFHS Mean Times for Assessment and Procedure Visits by Visit Type

Process	Mean	<u>SD</u>	Range	Median	
Sum all					
Assessment visits	0:26:49	0:10:48	0:11:44-0:54:14	0:23:55	40
Sum NP time	0:14:09				
Sum Clerk time	0:9:09				
Assessment only	0:22:54	0:14:55	0:11:44-0:52:54	0:20:47	20
Sum NP time	0:14:52				
Sum Clerk time	0:8:01				
Assessment plus					
1 task	0:27:38	0:10:40	0:13:50-0:48:52	0:24:51	13
Sum NP time	0:17:14				
Sum Clerk time	0:10:24				
Assessment plus					
2 tasks	0:33:32	0:07:05	0:21:33-0:42:40	0:33:24	7
Sum NP time	0:23:31				
Sum Clerk time	0:10:01				
Procedure plus 2					
tasks	1:14:16	NA	0:54:15 -1:34:19	1:14:17	2
Sum NP time	0:55:50				
Sum Clerk time	0:18:27				
Mean time for all					
visits	0:28:35	0:10:40	0:11:44-1:34:19	0:24:32	42
Sum NP time	0:19:00				
Sum Clerk time	0:9:35				

Note: All times are reported in hours, minutes, and seconds.

accounted for 45 percent of total labor cost. The ratio of direct to indirect labor was approximately 1:1.

Total patient revenues for the primary care clinic were \$115,381 for a revenue per visit of \$61. This revenue was greater than the cost of direct labor per visit but less than the total cost per visit resulting in an operating loss for NCFHS on primary care visits. Profitability would be enhanced by decreasing fixed costs. Salary and benefits was the major cost driver in this category, accounting for 88 percent of the total fixed costs.

### **Activities-Based Costing for UTHSC**

UTHSC divided their expenses into 2 separate accounts, one for student health services and the other for employees and non-student patient services. The process map for UTHSC demonstrated that only one process was used to provide services to all types of clinic patients. For the purposes of this analysis, expenses from the 2 accounts were combined into one expense report. Costs were then analyzed using the same costing model discussed in the gross-costing section. Since there was only one product, expenses in each category are identical to the expenses in the gross-costing section. The following summarizes the expenses for each category: \$113,047 for space rental, \$138,289 for operating expenses, and \$403,730 for salaries and benefits. Because the expense for contract services was completely passed on to patients, this expense was excluded from the analysis. Fixed and variable costs were the same as in the gross-costing section. Total fixed costs were \$258,304 and total variable costs were \$396,763.

### **Times Studies for UTHSC**

The snapback time study technique, using a digital stopwatch was used to time the length of each activity. Employees were timed over a 5 day period beginning the middle of one week and extending to the middle of the next week. The clinic was closed on weekends. As in the case of NCFHS, the time study was conducted during the Fall term.

During the course of the time study, an updated computer charting system was introduced. The staff complained that it was taking longer for them to chart because they were unfamiliar with the new system. To determine if the new computer system effected patient visit time, the data were grouped into before and after new charting system introduction and an independent t-test for unequal sample size was performed. The results of the t-test suggest there was no statistical difference between the groups ( $p = .39$ ).

There were two different processes, the assessment visit and the procedure visit. Both processes utilized a nurse practitioner, a licensed vocational nurse, and a clerk but required different amounts of labor input. The assessment visit had 3 variations: an assessment only, an assessment with one additional task, and an assessment with two other tasks. The additional tasks include the following: injections, laboratory tests, or giving out of sample medication. The average visit took 29 minutes and 27 seconds ( $SD = 9$  minutes and 9 seconds) and ranged from 12 minutes and 42 seconds to 1 hour and 33 seconds (see Table 12).

The procedure visit had two variations, the procedure only and the procedure with one additional task. The procedure only visit had a mean of 31 minutes and 48 seconds and ranged from a low of 24 minutes and 43 seconds to a high of 37 minutes and 8

**UTHSC Mean Times for Assessment and Procedure Visits by Visit Type**

<b>Process</b>	<b>Mean</b>	<b><u>SD</u></b>	<b>Range</b>	<b>Median</b>	<b><u>n</u></b>
All Assessment Visits	0:28:16	0:08:07	0:12:42-0:46:29	0:27:48	32
Sum Clerk Time	0:02:08				
Sum LVN time	0:10:29				
Sum NP Time	0:15:39				
Assessment only	0:28:12	0:07:21	0:16:49-0:41:37	0:27:48	14
Sum Clerk Time	0:02:21				
Sum LVN Time	0:09:07				
Sum NP Time	0:16:44				
Assessment plus 1 task	0:27:31	0:08:53	0:12:42-0:46:29	0:26:59	16
Sum Clerk Time	0:01:58				
Sum LVN Time	0:10:47				
Sum NP Time	0:14:46				
Assessment plus 2 tasks	0:34:38	0:01:29	0:33:09-0:36:08	0:34:38	2
Sum Clerk Time	0:01:58				
Sum LVN Time	0:17:41				
Sum NP Time	0:15:00				
Procedure only	0:31:48	0:04:14	0:24:43-0:37:08	0:31:38	5
Sum Clerk Time	0:01:58				
Sum LVN Time	0:07:39				
Sum NP Time	0:22:11				
Procedure plus 1 task	0:42:29	0:18:04	0:24:25-1:00:33	0:24:25	2
Sum Clerk Time	0:01:42				
Sum LVN Time	0:13:59				
Sum NP Time	0:26:48				
Mean time for all visits	0:29:27	0:09:09	0:12:42-1:00:33	0:28:03	39
Sum Clerk Time	0:02:05				
Sum LVN Time	0:10:18				
Sum NP Time	0:17:03				

Note: All times are reported in hours, minutes, and seconds.

seconds. There were five procedure only visits observed during the data collection period. Examples of observed procedures are pap smears and toe nail removal. There were only two observations of procedure visits in which one additional task was performed. The mean for these two observations was 42 minutes and 29 seconds.

The primary health care processes were labor intensive and labor was the most costly input. Visit time and cost increased with an increase in the number of tasks, with the exception of the assessment plus one task visit. The mean time for this type of visit was 41 seconds shorter than the mean for assessment only visits. One outlier appeared to account for the assessment only visit having a longer mean time than did the assessment plus one task visit. The outlier visit used a total of 41 minutes and 37 seconds. When the outlier case is excluded from the analysis, the mean visit time for the assessment only decreases to 27 minutes and 11 seconds.

The procedure visit was longer than the assessment visit. The mean for all procedure visits was 34 minutes and 51 seconds. There were five observations for procedure only visits and two for procedure plus two additional tasks. There were no observations for procedure plus one additional task.

Direct and indirect labor were primary cost drivers for the primary care processes accounting for 62 percent of total costs. Based on the activity-based time study data, a direct labor cost associated with the activity was calculated. This was done by summing the product of the activity time and the cost for each labor category. The cost of direct labor was \$14. This is the hypothetical cost associated purely with the activity and includes no indirect labor or corrections for staff utilization.

The actual cost for direct labor was determined by dividing the total compensation for direct labor by the number of patient visits. Unlike the gross-costing section in which total number of encounters were used, patient visits include only visits to the nursing center by patients for diagnosis and treatment of illness or trauma. Other encounters for reasons such as request for records or laboratory test results were not included. The actual direct labor cost was \$49 per visit. This cost takes into account overhead activities and excess capacity. Direct labor accounted for 71 percent of total labor costs and indirect labor accounted for 29 percent of total labor costs. The ratio of direct to indirect labor was approximately 2:1.

#### **Comparison of Activity-Based Costs for NCFHS and UTHSC**

The two nursing centers used similar processes in providing primary health care to their respective populations. Each center had assessment visits and procedure visits but procedures were a smaller percentage of overall visits than were assessment visits. At NCFHS procedures were only 5 percent of total visits and at UTHSC they were 18 percent. Both centers had observations for the three variations of assessment visits. In the procedure visit category, NCFHS had observations for only the procedure plus two tasks while UTHSC had observations for procedure only and procedure plus one task.

The staffing mix was different at the two nursing centers. NCFHS employed two direct labor categories consisting of a nurse practitioner and a clerk. There was only one staff member in each category. The nurse practitioner performed all clinical activities necessary to complete each patient visit. These activities included: putting the patient in an examination room, getting vital signs, assessing the patient, giving injections or sample

medications, and obtaining laboratory specimens. The staffing mix at UTHSC comprised three labor categories; clerks, LVN, and nurse practitioners. Clerks at UTHSC performed similar duties to the clerks at NCFHS. The LVN at UTHSC performed many of the activities carried out by the nurse practitioner at NCFHS.

Mean visit times for assessment visits were similar between the two nursing centers and at both centers the visit time increased with an increase in the number of tasks performed. T-tests were performed to determine statistical significance between times at the two nursing centers. NCFHS had slightly shorter visit times for all types of assessment visits than did UTHSC. The mean time for any type of assessment visit at NCFHS was 26 minutes and 49 seconds and at UTHSC the mean assessment visit time was 28 minutes and 16 seconds ( $p = .92$ ). There was considerable variation in the mean times for procedures between the two nursing centers with procedures taking nearly twice as long at NCFHS than at UTHSC but this was not statistically significant ( $p = .27$ ). The limited sample size, 2 observations at NCFHS, does not provide sufficient data for conclusions.

The hypothetical and actual costs of direct labor were similar at the two nursing centers. The hypothetical cost of direct labor at NCFHS was \$18 and \$14 at UTHSC. At NCFHS the actual cost of direct labor was \$41 and at UTHSC the actual cost was \$34. The ratios of direct to indirect labor at the two nursing centers were quite different. At NCFHS the ratio of direct to indirect costs was 1:1 and at UTHSC the ratio was approximately 2:1.

### **Discussion**

Utilizing both gross and activities-based costing techniques to analyze cost data can enhance the analysis and yield new information about the firm's cost structure. In the case of the NCFHS, activities-based costing provided valuable information not produced by gross-costing.

Gross-costing methodology demonstrated that salaries and benefits were the major cost category at NCFHS accounting for 87 percent of total costs. NCFHS could become more profitable by decreasing labor costs. This could be done by increasing the number of paying patient visits, decreasing the number of staff, substituting lower paid staff, or all of these.

To reach the break-even point, total expenses must equal total revenue. Patient revenues for NCFHS were \$138,936 for fiscal year 1997 and the total expenses were \$209,793. Assuming that revenue per encounter remained constant, patient visits would have to increase by 1162 visits for total patient visits of 3,057 for NCFHS to reach the break-even point. Given current staffing and scheduling patterns, NCFHS maximum patient capacity is 2,548 visits. Therefore increasing patient visits alone will not allow NCFHS to break-even.

Activity-based costing provided more specific information about the cost structure at NCFHS. Expenses and visits were separated by product lines into primary care and WIC and costs for each product were analyzed. Both products were operating at a deficit but micro-costing suggested different solutions.

According to the results of the activities-based costing, increasing the number of WIC encounters would only increase the net loss because the cost of direct labor is greater than the revenue generated. Unless WIC can decrease the cost of labor for each certification visit, the program will continue to incur a loss. Increasing the number of WIC clients will only increase the labor costs and will not make WIC profitable.

Labor costs might be decreased by decreasing the amount of time involved in producing certification encounters. Decreasing total labor for certification visits by 11 minutes would decrease labor costs to a break-even point when all other costs are held constant. This is a substantial change in visit time and does not seem feasible. Another possibility would be to use lower cost labor. WIC requirements may not permit substitution for the dietitian but substituting a lower paid clerk for the office manager would decrease the cost of labor.

Using technology as a substitute for labor might also lower costs. An example would be showing an educational video to a client and freeing up a portion of the dietitian time. This could decrease the amount of labor used in the production of a certification visit and would decrease the overall cost of labor.

Activity-based costing of the primary care clinic and its comparison to UTHSC suggest different possibilities for reaching the break even point. Visit times and direct labor costs were very similar between the two nursing centers. Staffing mix was different with UTHSC substituting lower cost LVN's to perform some nursing activities which at NCFHS were performed by a nurse practitioner. This substitution results in a small

increase in total nursing time for each visit but reduces total cost. Clerk time at UTHSC is significantly shorter than at NCFHS but does not result in a large effect on costs.

At NCFHS the hypothetical cost of direct labor was \$18 and the actual cost of direct labor was \$41. Therefore, it is possible to substantially reduce direct labor costs per visit by improving staff utilization. This could be done by increasing the number of patient visits and by transferring appropriate tasks from higher paid personnel to lower paid personnel. Reducing the amount of nursing time per visit would decrease direct labor costs. However, the similarity of visit times between the two nursing centers suggest that decreasing total nursing time may not be possible.

At UTHSC, the theoretical cost of direct labor was \$14 and the actual cost of labor was \$49 per visit. The discrepancy between these two costs suggest that UTHSC could also benefit by improving staff utilization.

Total costs per visit at NCFHS were \$90 and at UTHSC they were \$77. The difference in total costs were largely the result of differences in the costs of indirect labor. At NCFHS the cost ratio of direct to indirect labor was 1:1 while at UTHSC the cost ratio was 2:1. This suggest that NCFHS needs to substantially reduce the indirect labor expense to reach the break-even point.

Data published by the American Medical Association (AMA) about physician office expenses are similar to expenses at the two nursing centers. The AMA reports that mean office expense for a family practice physician was \$142,800 and for a 2 physician family practice was \$168,200. These data exclude salaries and benefits paid to the physicians. According to the AMA, the average non-solo family physician produces 3539

office visits per year for a cost per visit of \$48 (American Medical Association, 1997). When professional nursing salaries and benefits are excluded from expenses the office expenses for NCFHS and UTHSC are \$88,429 and \$447,148 respectively. When professional nursing salaries are excluded, the cost per visit at NCFHS was \$48 and at UTHSC it was \$54. It is important to note that the AMA data is for private medical practices. Academic medical practices may have different cost structures.

### **Capacity**

NCFHS is available for patient visits for 26 hours per week for 49 weeks per year. The center is not available for approximately one week of holiday time and two weeks of nurse practitioner vacation. Actual production for fiscal year 1996-1997 was 1895 visits which was one patient visit for every 40 minutes the clinic was open. Based on the time studies, staff could produce one patient visit every 30 minutes. This production time is equal to a maximum capacity of 2548 visits. However it is unreasonable to assume that staff could function at 100 percent or that no appointments would be missed, canceled, or delayed. A more reasonable estimate of capacity is to use 80 or 85 percent which yields 2038 or 2166 patient visits respectively. The number of patient visits needs to be increased by 143-271 visits to reach 80-85 percent of maximum capacity.

UTHSC is available for patient visits for 44 hours per week. The center is not available for one week of holiday time during the year. Since there are multiple employees in each employment category, the center is open when some staff are on vacation. The total number of hours available for patient visits is 2244. Based on actual productivity of 8317 patient visits, the center produced a patient visit every 16 minutes. Based on the

time studies, each nurse practitioner, LVN, and clerk could produce one patient visit every 30 minutes. Since there are 2.5 nurse practitioners, 2 LVNs, and 2 clerks there was a maximum capacity of 9,800 visits. At 80 to 85 percent of capacity the number of patient visits would be 7840 to 8330. Since UTHSC produced 8317 visits during fiscal year 1996-1997, it is functioning at approximately 85 percent of capacity.

Based on the time studies, and given that at UTHSC there are 2.5 nurse practitioners, it is possible to produce 5 patient visits every hour. This is a maximum capacity of a patient visit every 12 minutes. Currently, UTHSC is producing a visit every 16 minutes. It is unlikely that production could be further improved without increasing staff.

### **Scenario Analysis**

The study analyzed costs at two different nursing centers. Results suggest that the two nursing centers have similar total mean visit times and direct labor compensation. The two nursing centers have similar direct labor costs but dissimilar indirect labor costs. UTHSC has a lower percentage of indirect to total costs, a shorter length of clerk time per patient encounter, and a higher revenue per patient encounter. Although decreasing the amount of indirect labor is important for NCFHS financial health, this alone is insufficient to reach a break-even point.

Three scenario analyses were conducted to determine the number of patient visits needed for NCFHS to reach a break-even point. These scenarios examine primary care visits only and do not include WIC. Visit time, indirect labor costs, and direct labor costs were varied in these analyses. The following equations were used to calculate number of

patient visits:  $\text{revenue} = (\text{number of patient visits}) \times (\$ \text{ per patient visit})$ ;  $\text{cost} = \text{direct labor} + \text{indirect labor} + \text{other fixed costs} + (\text{number of patient visits})(\text{other cost per visit})$ ; and  $\text{revenue} - \text{cost} = 0$ . All of the following scenarios precede using the assumption that the nursing center could produce any number of patient visits at the existing fee.

### **Scenario One**

The first scenario examines reducing patient visit time and calculating the number of patient visits needed to reach break-even. In this scenario the following assumptions were made: (a) frequency of patient visits were increased to one visit every 20 minutes; (b) there was no change in staffing; (c) indirect costs, total operating hours, and revenue per visit were held constant at current levels; (d) primary care clinic operates at current status of 26 hours per week.

Revenue per patient visit at NCFHS was \$61. Direct labor, indirect labor, and other fixed costs amounted to \$160,759 and other costs per visit were \$5.55. Using the equation, NCFHS would need to produce 2,848 visits per year to reach break-even. This is greater than 100% of maximum capacity, based on current levels of production. Therefore, it is not feasible to reach break-even by increasing patient visits alone. Maximum capacity is 1274 hours per year times 2 patient visits per hour for a total of 2,548 patient visits per year.

### **Scenario Two**

The ratio of direct to indirect labor at NCFHS was 1:1 and at UTHSC this ratio was 2:1. NCFHS clearly needs to reduce its cost of indirect labor. In scenario two, the

effect of reducing the cost of indirect labor on the number of patient visits needed to reach break-even is analyzed. Several assumptions were made in conducting this scenario: (a) the primary care clinic office manager, a nursing director, and a physician consultant were necessary for the operation of the nursing center and these costs can not be decreased; (b) indirect labor expenses can be reduced to 25 percent of total costs or \$43,401; (c) staffing levels remained unchanged (d) patient mix remained unchanged; (e) patient revenue remained at \$62 per visit; (f) operating hours remained unchanged at 26 hours per week.

In this case, a total of 2,321 patient visits would be needed to reach break-even. This is 1.8 visits per hour or one patient visit every 33 minutes. At this production rate the clinic would be operating at 91 percent of maximum capacity. This appears to be a feasible scenario.

### **Scenario Three**

The next scenario examines the effect of increasing clinic hours for patient visits from 26 hours per week to 30 hours per week and adds salary and benefits for an LVN to direct labor expenses. No change in indirect labor or other fixed costs were made from the previous scenario. The salary and benefits were determined by using the mean expense incurred at UTHSC for LVN compensation. Since compensation expenses for nurse practitioners and clerks were similar at the two nursing centers, it is likely that compensation for an LVN would also be similar. Other assumptions include: (a) total nursing time was unchanged; (b) nurse practitioner time was 15 minutes or less. The break-even point requires 2664 patient visits for 1.8 patient visits every hour or one

patient visit every 33 minutes. In this scenario the clinic would be operating at 90 percent of maximum capacity. This appears to be a feasible alternative.

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## **CHAPTER VIII**

### **SUMMARY, LIMITATIONS, IMPLICATIONS, AND CONCLUSION**

The final chapter of the study provides a summary of the study, its limitations, and conclusions. The implications for nursing practice and recommendations for further research are also provided.

#### **Summary**

A nursing center is an ambulatory care clinic in which nurses provide health care to clients and manage both the operational and financial functions of the center (Barger & Rosenfeld, 1993; Gray 1993). Since 1980, academic based nursing centers have proliferated largely due to the need for clinical teaching sites for undergraduate and graduate nursing students and the availability of funding for demonstration projects for underserved populations (Reisch, 1992).

The literature suggests that nursing centers are financially vulnerable and at risk for closure (Barger, 1986; Barger & Rosenfeld, 1993; Mackey, Adams, & McNiel, 1994). The majority of nursing centers have been unable to achieve financial self-sufficiency (Mackey and McNiel 1997). Most academic based nurse-managed centers remain dependent on funding from charities, grants, and affiliated schools of nursing. Barger and colleagues predicted that a growing number of schools of nursing would be unable to continue to financially support nursing centers (Barger, Nugent, and Bridges 1993).

Understanding the costs of providing care is a crucial step for nursing centers to achieve economic independence and to survive and prosper in today's cost-conscious environment (Mackey and McNiel 1997).

There are few studies dealing with the cost issues involved in nursing centers and some of these studies have serious methodological or measurement problems. Some of the previous studies have used charge data as cost proxies and other studies analyzed only direct costs.

The study reported in this dissertation expanded current knowledge of the costs of providing care in nursing centers by analyzing and comparing cost structures of a profitable academic-based nursing center, which served as a benchmark, to an unprofitable academic-based nursing center. Costs were analyzed using both gross-costing and activities-based costing methodologies.

Labor was the major cost category at both nursing centers which is consistent with the results of the study by Saywell et al. (1995). The results from the gross-costing methodology suggest that NCFHS could become more profitable by increasing patient visits and by decreasing fixed costs. The total cost per visit at NCFHS was considerably higher than the cost per visit at UTHSC or the cost per visit reported in the study by Saywell (1995).

Analyzing costs using an activities-based costing methodology revealed that both nursing centers had similar visit times and direct labor costs and that indirect labor costs were much greater at NCFHS. Further, the ratio of direct to indirect labor was 1:1 at

NCFHS and 2:1 at UTHSC. It is these indirect costs that significantly contribute to the operating deficit incurred by NCFHS.

Additionally, NCFHS had a greater excess capacity for producing patient visits than did UTHSC. NCFHS was operating at 75 percent of productive capacity while UTHSC was operating at 85 percent of capacity. The time study data suggest that NCFHS could also achieve 85 percent of productive capacity without increasing staff but this alone is insufficient for NCFHS to reach break-even..

Three scenario analyses were conducted to determine the number of patient visits needed for NCFHS to reach a break-even point when labor costs were varied. The scenario analyses suggested that a break-even point can be reached only if NCFHS increases the number of primary health care patient visits and substantially decreases their indirect labor costs.

### **Limitations**

Data were collected from only two nursing centers. Therefore, there are several limitations in the study:

1. The findings in this study are limited to the two nursing centers and may not be generalizable to other nursing centers. Nursing centers not engaged in providing care to a student or university employee population may have different cost structures and visit times.
2. The time studies used a relatively small sample and sampling was done near the end of the school term. Periodic sampling occurring at random times throughout the year would help to ensure the sample is representative of all visits.

3. Direct, timed observation of the work-force may have led to a change in behavior. The Hawthorn effect may have biased the timed observations. Employees may have altered their productivity because they were aware that they were being observed.

### **Implications for Future Research**

While the present study makes a significant contribution to the existing literature, additional related studies will augment nursing center cost data. Cost comparison among and between nursing centers will assist in developing the nursing center concept and determining if nursing centers are a cost-effective model for the delivery of primary health care. Other studies of practice management issues such as revenue and reimbursement and patient demand are needed.

This study employed direct, timed observation in order to determine the consumption of direct labor by a particular activity. This is a labor intensive method and, therefore, may not be an attractive methodology for health care researchers or managers who want to calculate costs using activities-based costing. Cost studies using less labor intensive standardized protocols for determining the intensity of the consumption of direct labor are needed.

Student education is an integral component of the mission of many academic-based nursing centers. Since student education occurs within a patient care framework, there is a joint production of products. In order to determine the cost of education and its effect on nursing center profitability, the costs of student education must be parceled out from the costs of patient service.

### **Implications for Nursing Practice**

In order to survive, nursing centers must be cognizant of their costs and revenues. Profitability is crucial to the survivability of nursing centers and is determined by the ratio of total revenue to total costs. Nursing center revenue is constrained by many factors not under the control of nursing center management. These factors include state reimbursement laws, third-party reimbursement policies, and inertia on the part of third-party payers.

Unlike revenue, the locus of control for costs is with nursing center management. This study suggests that cost control, especially the control of indirect labor costs, can improve nursing center profitability which is crucial for nursing centers to be able to carry out their missions.

### **Conclusion**

In order to survive in the current cost conscious environment, nursing centers must achieve financial independence. Understanding and managing operational costs are crucial in attaining financial stability. The combined methodologies of gross-costing and activities-based costing to analyze operational costs enhanced understanding of two nursing center's cost structures. Results of this study suggest that indirect labor costs are important indicators of nursing center profitability. If this study is generalizable then, nursing centers with lower ratios of indirect labor costs to direct labor costs are more likely to be profitable than are nursing centers with high ratios of indirect to direct labor costs. The findings of this study have practical implications for those schools of nursing contemplating starting a nursing center as well as those with existing nursing centers.

## **APPENDICES**

**APPENDIX A****Data Collection Instrument**

<b>Activities</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
Pull & Ready Chart						
Est Pt Registration						
New Patient Registration						
Make Up Chart						
Verify Insurance						
<b>Room Patient</b>						
Give Injection						
<b>Review Chart</b>						
Assess Patient						
Patient Ed Forms						
Sample Meds						
<b>Labs</b>						
Obtain & Process onsite labs						
Obtain & process offsite labs						
Complete request forms						
<b>Procedure</b>						
Prepare room						
Do procedure						
<b>Consultation</b>						
Patient Checkout						
Schedule Appt						

**APPENDIX B**

Date: \_\_\_\_\_

**Informed Consent for Nursing Center Cost Analysis****Purpose of Study**

You are being asked to participate in a research study conducted by Deborah Vincent at the University of Michigan School of Nursing. The purpose of this study is to describe and analyze the costs involved in providing services at nursing centers. In order to do this accurately, the amount of time employees spend performing certain work activities must be determined. To do this, a time study will be conducted. The purpose of the time study is to accurately determine the amount of labor involved in producing certain activities and will only be used for this purpose

**Risks and Benefits to You**

There are no foreseen risks to you in participating in this study. You may find it interesting to talk to someone about your work.

**Confidentiality and Consent to Participate**

To safeguard confidentiality, the investigator will code identifying information. Only the investigator and research assistants will have access to the raw data. Since several employees are generally involved in each activity being studied, the amount of labor time for each activity will represent the combination of time of all of the involved employees. Therefore, it would be difficult for anyone to identify the contribution of any single employee to an individual activity. The time study will be conducted for approximately one week.

Your participation in this project is voluntary. Subsequent to your consent, you may refuse to participate or withdraw from the study at any time. One copy of this document will be kept together with our research records on this study. A second copy will be given to you to keep.

I have read the information given above. I understand the meaning of this information. Ms. Vincent has offered to answer any questions I may have concerning the study. I hereby consent to participate in the study.

Signature \_\_\_\_\_

Print Name \_\_\_\_\_

Investigator: \_\_\_\_\_

cc: to participant and to investigator's files