

AN EVALUATION OF THE PHYSICIAN-NURSE PRACTITIONER TEAM APPROACH
IN THE HEALTH CARE OF LONG-TERM CARE FACILITY
GERIATRIC PATIENTS

by

Elsie M. Balint, BA, RN, C

A THESIS

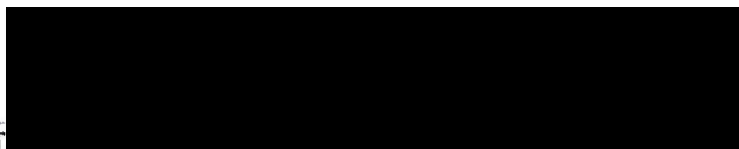
Presented to
The Oregon Health Sciences University
School of Nursing
in partial fulfillment
of the requirements for the degree of
Master of Nursing

June 11, 1982

APPROVED:



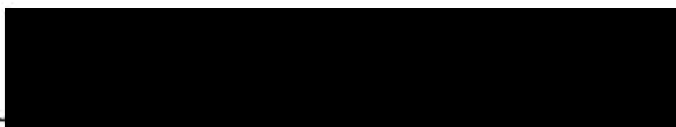
[Redacted Name], RN, PhD, Associate Professor, Thesis Advisor



Florence F. Hardesty, RN, PhD, Associate Professor, First Reader



[Redacted Name], RN, PhD, Associate Professor, Second Reader



Carol A. Lindeman, RN, PhD, Dean, School of Nursing

This work was supported, in part, by a United States
Public Health Service Traineeship from
Grant number MH 15595-02

To
George
and
Victoria
(who finally showed up)

ACKNOWLEDGMENTS

To Mom--who taught me how to cope;

To John--who taught me how to express myself;

To Lisa and Jeanne--who relinquished the classical mother so that
she could become an individual;

To Chris--who knew a priori that family came first;

To the "committee," near and far--who taught me how to mold my
Dostoevsky style to that of research . . .

near

Christine Tanner

Florence Hardesty Linda Kaeser

and far

Susan Will Sara Porter-Tibbetts

To the "Outreach Journal Club"--who helped me survive this whole
process; and,

To Cindy--just because . . . and whose unflagging attention to detail
saved this tome from a pile of un-APA }*cf#%&^{@

. . . . my deepest gratitude.

TABLE OF CONTENTS

CHAPTER I. INTRODUCTION	1
Statement of the Problem	1
Review of the Literature	3
Health-Care Needs of Geriatric Patients in LTCFs	4
Regulation of Health-Care Services in LTCFs	7
Existing Health-Care Providers in LTCFs	10
The MD-NP Team Model of Health-Care Delivery in LTCFs	14
Relative Cost of the MD-NP Team Model	18
Summary of the Literature Review	20
Rationale and Purposes of the Study	21
Hypotheses	22
CHAPTER II. METHODOLOGY	23
Design of the Study	24
Settings and Samples	24
Settings	24
Samples	25
Variables and Instruments	28
Independent Variable	28
Dependent Variables	28
Quality of Care Instrument	29
Utilization of Expensive Health-Care Services Instrument	31
Extraneous Variables	32
Data Collection Procedures	33
Data Analysis	33
CHAPTER III. RESULTS	34
Quality of Health Care	34

Maintenance Health Care	35
Episodic Health Care	35
Differences in Use of Individual Standards	36
Utilization of Expensive Health-Care Services	39
CHAPTER IV. DISCUSSION	42
Comparison with Review of Literature	42
Utilization of Health-Care Services	43
Quality of Health Care	45
Maintenance Health Care	46
Episodic Health Care	49
Methodological Issues	51
CHAPTER V. SUMMARY	55
Limitations of the Study	57
Implications of the Study	58
Recommendations for Further Study	59
.	
REFERENCES	61
APPENDICES	66
ABSTRACT	96

LIST OF APPENDICES

A.	Demographic Data Instrument	67
B.	Frequency Distribution of Subjects: Marital Status, Family Visits, Mode of Financial Support, and Ability to Care for Self Mentally and Physically	69
C.	Chi-Square and t -Test Computations of Demographic Data by Individual Characteristics	71
D.	Sources of Specific Health Care Standards for Chart Audit Instrument	76
E.	Quality of Health Care Chart Audit Instrument	78
F.	Distribution of Health Care Standards by Discipline to Which Standard is Pertinent	81
G.	Criteria Used in Determining Applicability of Standards . . .	83
H.	Utilization of Expensive Health-Care Services Instrument . .	89
I.	Sample Letters of Transmittal and Consent	91
J.	Computations by t -Test for Indicators of Utilization of Expensive Health-Care Services	94

LIST OF TABLES

1.	Frequency Distribution of Subjects: Age, Sex, Primary Diagnosis, and Total Number of Medical Diagnoses	26
2.	Mean Percentages of Provider-Compliance with Standards for Maintenance Health Care (as documented)	35
3.	Mean Percentages of Provider-Compliance with Standards for Episodic Health Care (as documented)	36
4.	Differences $\geq 10\%$ of Actual Attained Scores on Standards of Maintenance Health Care by Group within Health-Care Service Area	37
5.	Differences $\geq 10\%$ of Actual Attained Scores on Standards of Episodic Health Care by Group within Health-Care Service Area	38
6.	Average Frequency of Use Per Subject of Nonroutine Visits <u>Including</u> NP Visits	40
7.	Average Frequency of Use Per Subject of Nonroutine Visits <u>Excluding</u> NP Visits	40
8.	Average Frequency of Use Per Subject of Emergency Room	40
9.	Frequency Distribution of Subjects: Marital Status, Family Visits, Mode of Financial Support, and Ability to Care for Self Mentally and Physically.	70
10.	Distribution of Subjects by Age	72
11.	Distribution of Subjects by Primary Diagnosis	72
12.	Distribution of Subjects by Sex	72
13.	Distribution of Subjects by Total Number of Diagnoses Per Subject (Chi-Square)	73
14.	<u>t</u> -Test for Differences in Mean Total Number of Diagnoses Per Subject	73
15.	Distribution of Subjects by Marital Status	73
16.	Distribution of Subjects by Mode of Financial Support	74

17.	Distribution of Subjects by Family Visits	74
18.	Distribution of Subjects by Ability to Care for Self Mentally	74
19.	Distribution of Subjects by Ability to Care for Self Physically	75
20.	Sources of Specific Health Care Standards for Chart Audit Instrument	77
21.	Distribution of Quality of Health Care Standards by Discipline to Which Standard is Pertinent	82
22.	Use of Ambulance Transportation in Health-Care Services . .	95
23.	Number of Hospitalization Days Used for Nonelective Purposes	95

CHAPTER I

INTRODUCTION

The problem of providing high-quality, cost-effective health care to geriatric patients in long-term care facilities (LTCFs) has challenged health-care providers in the United States since the development of the convalescent hospitals early in this century (Brown, 1980). Diverse approaches to giving quality patient care have been used ranging from the early exclusively medical model to the present multidisciplinary model which combines physiological, psychosociological, and rehabilitative components. In today's LTCFs, the geriatric patient's complex health-care needs are increasingly met through the interdisciplinary-team approach. The physician, the LTCF health-care staff, and various consultants (such as social workers and therapists) provide the components of care.

Traditionally, the physician has been the head of the interdisciplinary team. In the context of the LTCF, the professional nurse may function as the coordinator of patient care, coordinating nursing activities with the other health-care activities of the interdisciplinary team (Brown, 1980; Gress, 1978). Ideally, this system will effectively meet the geriatric patient's health-care needs.

However, in 1977 Multnomah County's Nursing Home Assessment Project cited that 42% of the homes surveyed scored "poor" to "fair" on the basic nursing-care indicators. Also, in 1978 the state of Oregon's Report of the Joint Interim Task Force on Nursing Homes indicated that "three-quarters of the facilities [reviewed] have experienced difficulty in assuring that each patient's physician makes required visits" (Wolfer, 1978, p. 19).

A proposed remedy for these problems has been advanced. The state of Oregon's task force recommended "more frequent use of physician-supervised nursing practitioners . . . for increasing the efficiency of physician efforts within the nursing home sector" (Wolfer, 1978, p. 52). Further, Gerdes and Pratt (1978) asserted that the addition of a nurse practitioner (NP) to the health-care provider team of the LTCF would be the key to improvement of the quality of patient care in LTCFs.

In the state of Oregon, several nurse practitioners have been working with physicians in a collegial fashion, providing health care to patients in LTCFs during the past ten years. Gerdes and Pratt (1979), in association with the Mountain States Health Corporation, have assessed the impact of the geriatric nurse practitioner as an employee of the LTCF in Oregon. Only a few studies exist to evaluate the effect of the physician-nurse practitioner (MD-NP) team in the health care of the geriatric patient in LTCFs. Researchers call for more data to determine the degree of improved patient welfare within

the aged population in LTCFs and the cost-efficiency resulting from the intervention of the nurse practitioner (Gerdes & Pratt, 1979; Gerdes, 1978; Gerdes & Pratt, 1978; Wolfer, 1978; Gerdes, Monley, & Pratt, 1977).

The general purpose of this study, therefore, is to evaluate the MD-NP team approach in the health care of the LTCF geriatric patients. The specific goals of this study are: (a) to examine the quality of health care received by the LTCF geriatric patients from the MD-NP teams as compared to that from physicians only and (b) to examine the utilization of expensive health-care services by the MD-NP team approach as compared to that of the traditional medical approach in the health care of LTCF geriatric patients.

Review of the Literature

It is the experience of this investigator that there is a deficiency in the health care delivered to LTCF geriatric patients. In an attempt to clarify the dimensions of this deficiency, the review of the literature focuses on: (a) the complexity of the health-care needs of the institutionalized elderly, (b) the federal and state regulations for LTCFs regarding professional health-care services which may not meet the patient's health needs, and (c) an alternative mode of health-care delivery for patients in LTCFs.

Health-Care Needs of Geriatric
Patients in LTCFs

The size of the problem of providing health-care for the elderly infirm is increasing. As health care in the United States has improved, the individual life expectancy of its citizens has risen. In contrast to the 22 million individuals aged 65 or more in 1971, statisticians project 30 million persons over 65 in the year 2000 and a possible 51.6 million persons by the year 2030 (Brown, 1980).

Persons aged 65 and above have a 20% chance of entering an LTCF for management and treatment of chronic disease at least at some time in their lives (Kovar, 1977). Since the LTCF population changes over time, the total percentage of the elderly utilizing an LTCF at any given time is approximately 5% of the total geriatric population (Brown, 1980). By the year 2030, this 5% of the elderly requiring LTCF care may possibly be in excess of 2.5 million persons.

Not only is the size of the problem of providing health care to the LTCF geriatric patients increasing, but also the health-care needs, themselves, increase in complexity as the person ages (Libow, 1982). In general, the probability of multiple health needs becomes greater for persons over the age of 45 (Brown, 1980; Kovar, 1977; Brocklehurst & Hanley, 1976). Specific areas influencing need include age-related conditions, multiple chronic diseases with both

physical and mental functional impairment, and frequent episodes of acute illness.

Differentiation between age-related physiological changes which may not be treatable and disease-related physiological changes which can be treated, introduces complexity into the health care of the elderly. Among these puzzling age-related versus true physiological problems are:

Impairment of the control of body temperature and of the maintenance of blood pressure on change of posture are also common phenomena in the aged, and it is by no means certain whether these are always effects of cerebrovascular disease or whether they may in part be due to age changes in their controlling centres in the brain. (Brocklehurst & Hanley, 1976, p. 25)

Additionally, old people tend to have multiple physiological health problems which can have their etiology in a single system (such as chronic obstructive pulmonary disease with any combination of emphysema, asthma, and bronchitis) or multiple systems (such as diabetes mellitus with diabetic retinopathy and peripheral neuropathy). Also, old people tend to have more malignant cancers, cardiovascular disease, arthritis, and visual and hearing impairments than do young people (Brown, 1980; Brocklehurst & Hanley, 1976; Rossman, 1971).

Furthermore, mental failure--either organic or functional--has a high incidence in the elderly. To quote Brocklehurst and Hanley, "mental confusion is the very stuff of

geriatric medicine" (1976, p. 59). Long-term mental dysfunction or senility, complicated by wandering and/or other inappropriate behaviors such as combativeness or self-isolation, increases the likelihood of LTCF placement (Brown, 1980; Burnside, 1980; Kovar, 1977; Brocklehurst & Hanley, 1976).

Also of high incidence in LTCFs are conditions requiring extensive rehabilitation (Libow, 1982; Kovar, 1977; Brocklehurst & Hanley, 1976). These include acute physiological problems such as a stroke or a fractured hip as well as some forms of chronic disease such as Parkinson's syndrome, arthritis, and organic brain syndrome. Patients with these conditions respond to rehabilitative efforts directed toward muscle strengthening and locomotor training, increasing mental clarity, and continence training.

Psychosocial problems of the patient and family form another aspect of the health-care needs of the institutionalized elderly. Entry into an LTCF is often interpreted by the patient and family as the "final move." Fears of separation, loss of role and self-esteem, isolation, and death form other stresses for the already complex health needs of the LTCF patient (Burnside, 1980; Beck, 1979; Brocklehurst & Hanley, 1976).

In terms of episodic health-care needs, Brocklehurst and Hanley note that, "old people are more susceptible to acute illness than other groups of the population" (1976, p. 24). This susceptibility remains true for LTCF patients.

Reasons for admission to LTCFs are loss (or exhaustion) of family support systems, mental alertness, locomotor and self-care skills, and/or debilitation from chronic disease. In 1977, Kovar noted in his analysis of nursing-home populations that almost two-thirds were senile, a third were bedfast or chairfast, and a third were incontinent. Underlying diagnoses which precipitate these disabilities are multiple (Brown, 1980; Kovar, 1977; Brocklehurst & Hanley, 1976).

In summary, the health-care needs of the LTCF geriatric patient, more often than not, combine all of these elements: episodic and chronic physical and mental health problems, problems amenable to extensive rehabilitation, and psychosocial problems. Therefore, with the increasing demand for the care provided in the LTCF and the complexity in the health-care needs of the elderly, the health-care services within the LTCF should be reexamined.

Regulation of Health-Care Services in LTCFs

Federal Medicare insurance and state Medicaid welfare regulations prescribe minimum medical and nursing services required in LTCFs to meet the health-care needs of patients who are eligible for these programs. In general, Medicare services in LTCFs only apply when the person is thought to have rehabilitative potential and a short-term need for services. Medicaid, on the other hand, covers the eligible person in either long- or short-term care without regard

for rehabilitation potential. Generally, the private insurance agencies, like Blue Cross, follow Medicare rather than Medicaid regulations for reimbursement eligibility. (Hereafter, the term "Medicaid" will be used to describe health-care aid in all states.)

Skilled Nursing Facility (SNF) beds are utilized by both Medicare- and Medicaid-eligible clients, but Intermediate Care Facility (ICF) beds are utilized by Medicaid only. Medicaid standards for determination of admission criteria vis-a-vis SNFs or ICFs are established by the states under broad federal guidelines, and there is a wide variance. For example, most LTCF Medicaid clients in Oregon are in ICFs while in Washington and California these clients are in SNFs. States have used various strategies to control utilization of SNF and ICF services by Medicaid clients (Foley, Mengr, & Schneider, 1980; Altieri, Sedutto, Feder, & Weissman, 1977). In Oregon this is done through state pre-admission screening teams and the Professional Standards Review Organization (PSRO) reviews of individual care.

In addition to utilization control, the state assumes responsibility for regulation of quality of care. In Oregon, the State Health Division monitors facility staffing plus general health and safety measures. The state long-term care agency and PSRO monitors the care of individual clients who are eligible for Medicaid.

Oregon regulations require an SNF to staff patient-care personnel at 2.5 contact hours per patient per day, which includes 0.45 contact hours per patient per day of registered nurse (RN) and licensed practical nurse (LPN) time. An ICF is required to staff at 1.61 contact hours per patient per day, which includes 0.28 hours per patient per day of RN and LPN time (Oregon Administrative Rules, 1980; hereafter referred to as "OAR").

The composition of nursing personnel within the set ratio for both types of LTCFs is also dictated to the extent that a registered nurse (RN) will be on duty during the eight hours which are termed the day shift by the LTCF. In an ICF, the hours provided by the director of nursing services (an RN) can be included in this requirement, but in an SNF these hours cannot be included. For the remaining two shifts, it is acceptable to employ licensed practical nurses (LPNs) as the charge nurses. The remainder of nursing-personnel contact hours may be filled by non-licensed nursing assistants (OAR, 1980).

Regulations require physician services in attendance at least every 30 days for the first 90 days for a patient determined as needing skilled-nursing care. Thereafter, an alternate schedule of every 60 days is permissible if the patient's medical condition so warrants. For a patient requiring an intermediate level of nursing care, similar regulations stipulate a visit from a physician every 60

days (OAR, 1980). These regulations apply to patients who receive financial aid from Medicare and/or Medicaid.

It is questionable if the existing minimal requirements of health-care services meet the actual needs of the LTCF geriatric patient.

Existing Health-Care Providers in LTCFs

Nursing services. According to Gerdes, "nursing care is the predominant service that should be, and is, in fact, provided in the nursing home" (1978, p. 8). Indeed, nursing services are the backbone of supportive care for patients in LTCFs. Observation of the patient for change in health status is made on a daily basis by the nursing personnel. Assessment and nursing diagnosis of any change requires licensed nursing skills. Communication regarding the nature of changes in the patient's physical and mental health is made to the physician for medical assessment by the licensed "charge" nurse by telephone. Thus, the physician's assessment often rests on the accuracy of the initial determination made by the nurse and its accurate presentation to the physician. Therefore, there is a need for highly-skilled professional nurses on the LTCF staff.

Aiken (1981) disagrees with Gerdes and asserts that the use of the term "nursing" in the label "nursing home" is a misnomer. According to her statistics, "only 5% of nursing home employees are registered nurses" (p. 39). She cites that "on an average day in an

average nursing home, there are only 1.5 licensed health-care providers [RNs and LPNs] for every 100 patients [or 12 hours, instead of the minimum ICF requirement of 28 hours]" (p. 329). This statistic emphasizes the problems in distribution of licensed nursing personnel in LTCFs and compliance with rules and regulations.

An example of the distribution of actual patient-contact hours takes the following form. An 80-bed ICF, meeting the basic lower limit of mandated personnel staffing patterns for patient care, should provide 128.8 hours of patient care daily for the 80 patients. Regulations require a registered nurse as charge nurse on the day shift. The 8 hours of charge-nurse time is divided by the number of patients in that charge, equaling an average of 0.10 contact hours or, more specifically, 6 minutes per patient per day shift. During those brief minutes, the charge nurse is responsible for patient observation, assessment, care planning, implementation of the plan, evaluation, and recording of the type of health care delivered along with the response to that care. In reality, there is even less time for patient care since the charge nurse's principle responsibility is administrative in nature. In addition, all of the available time is not productive time. Actual charge-nurse time for patient care is probably closer to three minutes per patient. On the remaining two shifts, either LPNs or RNs (depending on local availability and the LTCF hiring policy) are responsible for a similar job description. In total, any individual patient can expect less than 18 minutes of

care by RNs or LPNs in a 24-hour day. In this example, the remaining 1.31 contact hours, or 78.6 minutes per patient per day, are supplied by non-licensed nursing assistants.

For a patient with stable medical and psychosocial problems and no rehabilitation needs, this level of care may meet the custodial needs which brought the patient to the ICF for long-term care. However, these needs may change as illness plagues the elderly more than any other population (Brocklehurst & Hanley, 1976). These episodic changes may or may not be observed by the non-licensed personnel who have the greater patient-contact time.

Physician services. Even in the presence of reported changes in the patient's health, studies have demonstrated the difficulty of obtaining physician visits to the LTCF (Mitchell, 1982; Wolfer, 1978; Multnomah County Department of Human Services, 1977; Solon, 1977; U. S. Department of Health, Education, & Welfare, 1975). This difficulty is present for mandated visits to assess patient status (a maintenance or routine health-care visit) as well as those necessitated by an acute change in the patient's health status (an episodic or nonroutine health-care visit).

Some patients have their own physicians, while other patients rely on the services of a physician who has a contract with the state health division to provide medical services to patients in a specific LTCF. These MDs are known as congregate-care or "facility" physicians and are expected to visit patients every 30 days. A

private or noncongregate-care physician is expected to make routine visits every 30 or 60 days, depending on the type of LTCF and the physical status of the patient. The 1977 report of the National Center for Health Statistics, as quoted by Mitchell (1982), found that only 29% of all LTCF patients are medically treated by a "facility" physician. This leaves the remaining percentage as treated by private, noncongregate-care physicians.

The state of Oregon's Report of the Joint Interim Task Force on Nursing Homes (Wolfer, 1978) found that 75% of LTCFs answered affirmatively to the question, "Have you or your staff experienced difficulty in assuring that each patient's physician makes required visits?" (p. 52). This question is unclear since it does not differentiate between mandated maintenance health-care visits and episodic health-care visits. Therefore, the affirmative response may not reflect the whole difficulty, but may illustrate some of the problems faced by physicians making priority decisions for episodic care. If a nursing-home patient becomes ill, the physician in private practice has several options to review: (a) during the working day, to leave an office filled with patients to travel to the LTCF; (b) evaluate and treat the LTCF patient by means of a nursing presentation of the patient's problem by the LTCF staff over the telephone; (c) arrange to visit the LTCF patient during the lunch hour or after office hours; or (d) send the LTCF patient to the hospital emergency room for evaluation by the physician there. None

of these solutions are ideal, given the possible limited assessment within the LTCF and the costs of travel and the emergency room.

To summarize, federal and state regulations, the choices demanded of the physician, and the health status of the LTCF patient may combine to reinforce the deficiency in the health-care services needed to meet the complex health-care problems of the LTCF geriatric patient. One proposed remedy, to fill this perceived gap between patient health-care needs and the medical health-care delivery available to the patient, is the addition of the certified nurse practitioner to the health-care team (Gerdes & Pratt, 1979; Gerdes, 1978; Wolfer, 1978; Gerdes et al., 1977).

The MD-NP Team Model of Health-Care Delivery in LTCFs

The United States Senate Subcommittee on Aging (1975) highlighted the lack of adequate professional services to the patients in LTCFs. One of the recommendations to this committee by the American Nurses Association (1975) was the education of nurse practitioners to provide primary health care to patients in LTCFs. The nurse practitioner (NP) is formally prepared to perform in a collegial mode with the physician (MD). Through advanced training and interdisciplinary-team experience, the NP adds the dimension of advanced nursing assessment, coordination of patient care, and complex nursing interventions frequently viewed as tasks formerly performed by physicians only (W. K. Kellogg Foundation, 1981; Oregon

Regulatory Statute #678, 1980; Kleinman & Sullivan, 1979; Brody, Cole, Storey, & Wink, 1976). In this sense, the NP role forms a bridge between the two professions--medicine and nursing.

Kleinman and Sullivan (1979) identified three components of the nurse practitioner role: (a) the initiation of care by entering the client into the health-care system, (b) the continuation of care by acting as the primary care-giver over time, and (c) the coordination of care by initiating and integrating other types of services needed by the patient. The interdisciplinary nature of the NP educational program was described by Kleinman and Sullivan (1979) who also stressed the differences between the disease-oriented, curing medical approach and the person-oriented, caring approach of the nursing model.

An early study by Lowenthal and Breitenbucher (1975) reported a one-year study of 100 systematically-selected patients, all classified as needing an intermediate level of nursing care. Half of the subjects were under the care of an MD-NP team and half were under the care of medical residents. Data were compared on notation of four process variables: nursing problems, psychosocial problems, and minor and major medical problems. Each patient was then reexamined by a single physician as an additional control. The researchers stated that there were no significant differences in the recorded identification of any of the types of problems under consideration, but slightly more medical problems were identified by the NPs than

the medical residents. Reasons for this, which were cited by Lowenthal and Breitenbacher, were: (a) the increased time the NP was able to give to the patients, (b) the attitude of the nursing home staff towards the NP as being more accessible or more receptive, and (c) the possible greater illness of the NPs' populations. In this study, the settings were dissimilar in that the NP sites were all ICFs, in contrast to the medical resident sites which were all SNFs. No mention was made of the different staffing ratios of licensed nursing personnel. The findings of a study which compared equivalent groups in the same settings would provide clearer information.

Brody et al. (1976) conducted a study of the geriatric nurse practitioner in LTCFs. The study contrasted the quality of care of the MD-NP team with health care delivered in the traditional physician model as reflected by the evaluation of the process of medical care. The nursing component of the team was not specifically tested. Although no data were presented, the conclusion was that "the medical care was clearly of a higher order as delivered by the physician/nurse practitioner team" (p. 540). In this study, attention was given to psychosocial and functional health problems. These aspects of care are included in the standards of nursing practice (American Nurses Association, 1973b). Brody et al. also asserted that the MD-NP team has superior awareness of socialization and functional problems, and that this awareness was demonstrated by the chart review.

Pepper, Kane, and Teteberg (1978) conducted a nonrandom, comparative study of the process of the nurse practitioner role in 13 ICFs in Utah. They found that "over 80% of the problem situations referred to the nurse practitioner can be solved without recourse to medication. . . . Health maintenance and illness prevention are emphasized and the nurse [practitioner] educates the patient and his family [as well as the nursing personnel]" (p. 63). These processes are functions well within the scope of nursing practice. The additional NP skills were not addressed.

Some disadvantages to the use of the NP in LTCFs have been identified by Loeb and Robison (1977). Federal and state regulations require the MD to cosign all progress notes and medication and treatment orders of the NP. Additionally, Loeb and Robison state that duplication of effort in terms of the NP's triage visit followed by the MD's visit is not efficient use of financial resources, but the incidence of this occurrence is low. Further, they add that avenues of reimbursement for NP services are developing slowly nationwide (Loeb & Robison, 1977).

Researchers have persisted in evaluating the process of the MD-NP team's health care by either medical or nursing standards of care, regardless of the setting (Prescott & Driscoll, 1980; Sox, 1979; Zimmer, 1979; Simborg, Starfield, & Horn, 1978; Abdellah, 1977; Runyon, 1975; Spitzer, 1974). It is far more logical that the health care of the MD-NP team be evaluated by a combination of medical and

nursing standards of care. However, instruments of this type for evaluating the performance of the nurse practitioner or the MD-NP team in LTCF settings do not exist in the literature.

Prescott and Driscoll (1980) surveyed 26 studies evaluating NP performance. Of these, 21 studies measured NP performance against that of the MD, while 5 studies measured both the NP and the MD against specific neutral criteria. Of the studies reviewed by Prescott and Driscoll, only four focused on the "care-cure" distinction of the NP and MD roles. None of these studies were conducted in an LTCF setting.

In summary, researchers have not agreed on the effectiveness of the MD-NP team in the health care of geriatric patients in LTCFs. Further, the MD-NP team's performance has been measured against standards of either medical or nursing practice instead of standards from both types of practice. Also, the process of health-care delivery in LTCFs has been investigated, but study of the outcomes of that process is needed to evaluate the quality of care administered by the MD-NP team.

Relative Cost of the MD-NP Team Model

Few studies exist which address the relative cost of quality health care to patients in LTCFs as provided by NPs. The studies which do examine cost, do so indirectly by measuring the usage of expensive health-care services rather than measuring the direct

dollar cost associated with these services. However, the researchers write of "direct cost benefits" although no direct dollar amounts were presented in any of the studies. This practice will be continued in this discussion.

Kane (1976) addressed cost-effectiveness in his study of an MD-NP team in 13 ICFs in Utah. Direct cost benefits measured were usage of medications, transportation, and hospitalization. Indirect cost benefits measured included improved patient functioning and improved performance of the nursing home staff. By changing the manner of health-care delivery from the outpatient department of the hospital to the LTCF itself, direct cost benefits were realized in terms of transportation and hospital use. Reduction in use of medication resulted from increased staff education by the NP. The indirect cost benefits were difficult to measure. The findings of this study were corroborated by Gerdes and Pratt (1979).

A study by Spector, McGrath, Alpert, Cohen, and Aikins (1975) compared the cost of medical care with that provided by a physician with additive NP interim care. All patients selected for care by the NP were required to see the physician first. Services were duplicated in this manner with the resulting increase in relative cost of patient health care. However, Spector et al. found that 85% of the new health problems and 95% of the old problems could be adequately cared for by the NP.

In 1977, Loeb and Robison reported an observational study of the development of an MD-NP team approach in the care of patients in SNFs. Though no data were presented, they found that the team physician was able to use his or her time more effectively and provide medical supervision for a greater number of patients by sharing responsibilities with a nurse practitioner. With the rising costs of medical care, Freund (1981) and Edmunds (1980) have called for further examination of the economic impact of the nurse practitioner.

Researchers have not agreed regarding the cost-effectiveness of the MD-NP team in the health care provided to geriatric patients in LTCFs. Further, comparison of direct or indirect costs of health care provided by the MD-NP teams compared to MDs alone has not been investigated.

Summary of the Literature Review

The health-care needs of the institutionalized elderly are complex. In addition to age-related conditions, multiple chronic physical illnesses, and rehabilitation needs, LTCF patients must endure the additional psychosocial problems resulting from separation from family and significant others, role loss, and the worry of impending death. These additional stresses compound the health-care needs of these aged individuals.

Existing federal and state rules and regulations which mandate health-care provision to patients in LTCFs may not meet the health-care needs of the geriatric patients. Present staffing patterns of nursing personnel to meet regulations result in the least-trained personnel having the greatest amount of patient observation time. Also, the frequency of physician's visits may not meet optimal health-care requirements.

Studies have identified these deficiencies in health-care provision to geriatric patients in LTCFs. As a remedy, several sources have proposed the inclusion of the nurse practitioner in the health-care delivery system. Little research has been conducted to evaluate the effectiveness of the NP role in LTCFs. Existing research compares the performance of the NP to that of the MD. Prescott and Driscoll (1980) call for evaluation of the "care-cure" components of the NP role, and evaluation of the MD-NP team performance against fixed standards.

Rationale and Purposes of the Study

The first purpose of this study is to evaluate the MD-NP team approach in the health care of the LTCF geriatric patient using a comparison group of patients cared for by MDs in the same settings. Based on prior literature, it could not be predicted that there would be a difference between the quality of health care provided by MD-NP teams and that provided by MDs for either maintenance health-care

needs or episodic health-care needs. Therefore, the hypotheses were tested in the null form.

H_{0_1} : There is no difference between the quality of health care provided by MD-NP teams and MDs for the maintenance health-care needs of geriatric patients in LTCFs.

H_{0_2} : There is no difference between the quality of health care provided by MD-NP teams and MDs for the episodic health-care needs of geriatric patients in LTCFs.

The second purpose of this study was to collect data on utilization of expensive health-care services by MD-NP teams and MDs in the health care of geriatric patients in LTCFs as an indirect measure of factors contributing to direct health-care costs. Again, there was not sufficient prior work to justify predicting a difference between the MD-NP teams and the MDs on utilization of expensive health-care services. The hypothesis, therefore, was tested in the null form.

H_{0_3} : There is no difference between MD-NP teams and MDs on utilization of expensive health-care services in the health care of geriatric patients in LTCFs.

CHAPTER II

METHODOLOGY

This study examined: (a) the quality of health care provided to LTCF geriatric patients by MD-NP teams in contrast to that by MDs only and (b) the utilization of expensive health-care services by MDs and MD-NP teams in the health care of geriatric patients.

The quality of health care delivered by either the MD or MD-NP team was evaluated by means of a retrospective chart audit specifically designed for the study. This audit included 31 fixed standards related to documentation of patient assessment, planning, implementation, and evaluation of medical and nursing care for maintenance and episodic health-care incidences. These standards were derived from three principle sources: (a) the Medicare/Medicaid Skilled Nursing Facility Survey Report (1976), (b) the American Nurses Association Standards of Gerontological Nursing Practice (1973a), and (c) the scope of practice of nurse practitioners in the state of Oregon (Oregon Regulatory Statute #678, 1980). The health-care activities of MDs and NPs were measured against the same absolute standards. Extracted from the individual medical records of the subjects, the data measured the percentages of compliance by the health-care provider against these absolute standards.

The utilization of expensive health-care services by MD-NP teams in relation to the traditional medical approach was measured on four direct cost factors. Utilization was measured directly by counting the frequency of use of: (a) physician care and (b) other expensive ancillary services such as transportation by ambulance for health care, emergency room use, and hospitalization for nonelective reasons.

Design of the Study

Each of the three settings in this study had populations whose care was the responsibility of an MD-NP team or an MD. Random assignment of the MD-NP teams to ICFs was not feasible. The experimental group was comprised of 30 medical records, with 10 from each of the 3 MD-NP team's practice; the control group was comprised of 30 records, with 10 from each of the 3 ICFs. The resulting design of the study was a posttest only, nonequivalent control group design which used a retrospective chart audit.

Settings and Samples

Settings

Three separate, medium-sized ICFs (intermediate-care facilities) in different locations in Oregon comprised the settings for this study. Similarity among the three settings included nursing personnel staffing patterns, accountability to ICF rules and

regulations, and operation for profit. In each ICF, the same nursing personnel cared for the patients of both the MDs and MD-NP teams. A difference in sites was the provision of health-care service by three separate MD-NP teams and three distinct groups of MDs for each location.

Samples

The study sample was comprised of the medical records of 60 individual subjects in 3 ICFs in Oregon. All subjects were designated by the PSRO (Professional Standards Review Organization) of Oregon as requiring an intermediate level of nursing care. The study sample was divided into: (a) the study group of 30 medical records of subjects under the care of an MD-NP team, 10 from each of the 3 ICFs, and (b) a comparison group of 30 medical records of subjects under the care of MDs, 10 from each of the settings. The medical records were randomly selected with replacement to control for biases among the groups--e.g., age, sex, marital status, and number of chronic diseases. The records were drawn from an available pool of admission numbers representing patients who were living in the ICF for at least 12 months during the period from January 1979 through December 1980. Subjects who were hospitalized and returned to the same ICF during the 12-month study period were included in the pool. Findings of the study are generalizable to the accessible population within the study settings only.

Characteristics of Subjects in the Samples. Demographic data were collected on nine characteristics of the subjects in each sample (see Appendix A for the demographic data instrument). Data on four of these characteristics--age, sex, primary diagnosis, and total number of medical diagnoses--are summarized in Table 1. The remainder of the demographic data is summarized in Appendix B, Table 9.

TABLE 1

Frequency Distribution of Subjects:
Age, Sex, Primary Diagnosis, and Total Number of Medical Diagnoses

Characteristic	Number of subjects by group	
	MD-NP teams	MDs
Age		
65-74	7	7
75-84	7	8
≥ 85	16	15
Sex		
Male	16	8
Female	14	22
Primary diagnosis		
Cardiovascular	19	16
Neurological/psychiatric	7	9
Endocrine	2	2
Other	2	3
Total number of medical diagnoses		
< 8	17	26
≥ 8	13	4

Because subjects could not be randomly assigned to treatment teams, differences in the two nonequivalent groups were possible. The obtained nominal or interval level data were tested for differences by the chi-square or t-test statistic on the nine characteristics. The level of significance for each test was set at 0.05.

By inspection, raw data of the age and type of primary diagnosis categories revealed no large differences. Chi-square values for each supported this observation (see Appendix C, Tables 10 and 11, for calculations of these demographic data).

There were significant differences on two demographic characteristics. There were significantly more males in the study group, the MD-NP teams, than in the comparison group, the MDs ($\chi^2 = 4.44$, $p = 0.04$; see Appendix C, Table 12).

There was also a difference in distribution of the total number of medical diagnoses. Using the chi-square statistic, the study group contained significantly more subjects with a greater total number of medical diagnoses than the comparison group ($\chi^2 = 5.64$, $p < 0.05$; see Appendix C, Table 13). However, when the total number of medical diagnoses was viewed as interval data, comparison by the t-test statistic yielded a value of 0.08 which is not significant. The average number of diagnoses for the MD-NP teams was 7.23 ± 3.27 , whereas the average number of diagnoses for the MDs was 6.63 ± 2.89 (see Appendix C, Table 14).

The remaining five characteristics showed no significant differences when the chi-square values were calculated (see Appendix C, Tables 15-19, for computations of marital status, mode of financial support, presence of family visits, and ability to care for self mentally and physically). Thus, the study group (the MD-NP teams) and the comparison group (the MDs) were similar except for the probability of a slight difference in the sex distribution.

Variables and Instruments

Independent Variable

The independent variable of this study was the model of health-care delivery. Two levels of this model were examined, that of the MDs alone, and that of the MD-NP team. No effort was made to further define the specific model of practice design used by either level of health-care provider.

Dependent Variables

Two dependent variables were examined. These were the quality of health care, which included the two components of maintenance and episodic health care, and the utilization of expensive health-care services.

Quality of Care Instrument

Since no instrument could be found which measured the performance of the MD-NP team in LTCFs in the manner discussed by Prescott and Driscoll (1980), one was developed by this investigator. This instrument measured the quality of health care in terms of fixed standards relating to documentation of patient assessment, planning, implementation, and evaluation of medical and nursing care for maintenance and episodic incidences. As previously discussed, standards were taken from three sources (see Appendix D, Table 20, for the sources of specific standards.) The resulting instrument was a 31-item checklist (Appendix E). The standards were developed in three general areas of service in terms of the discipline of health care to which the specific standards were pertinent: (a) medical, (b) medical and nursing combined, and (c) nursing services. Table 21 in Appendix F shows the distribution of the quality of health care standards by discipline to which each standard is pertinent.

The instrument was constructed in such a way as to allow measurement on the four modalities of the health-care process (assessment, planning, implementation, and evaluation). The standards were divided into two major sets: maintenance and episodic health care. There were 15 standards related to episodic health care and 21 standards related to maintenance health care.

Administration and scoring were completed by the investigator from minimal information included in the documentation on the entire

medical record of each subject during the 12 consecutive months of the study period. Scores for the MD-NP team were based on the presence of notation by either member of the team additively, as a function of the team. Maintenance and episodic health care were scored separately. The attainment of maintenance and episodic health care standards was computed in two steps. First, the total possible score for any given patient was computed by adding the number of items which were applicable for that patient. Second, the actual score obtained by the health-care provider was the sum of those standards noted divided by the total possible score, yielding two percentages--one for maintenance and one for episodic health care.

Applicability of standards was determined by two sources: (a) individual patient variations (e.g., lack of family visits or lack of patient orientation) and (b) differences in the manner of patient problem assessment and management (e.g., by telephone or in person). (See Appendix G for criteria used in determining applicability of standards.) The instrument was tested for the measurement of quality of health care by submission to an independent panel of experts comprised of a nurse practitioner, a physician, and a nurse. This review established content validity of the instrument only. The instrument was not tested for reliability.

Utilization of Expensive Health-Care
Services Instrument

The second dependent variable was the utilization of health-care services provided by the MD and the MD-NP team. The actual cost was not measured directly; rather, cost was measured indirectly in terms of utilization of four expensive health-care services (or indicators). The instrument was a checklist which contained the indicators and the month of use of the specific indicator (Appendix H). The checklist was completed by the investigator from the medical record of each subject in the two samples. For purposes of data analysis of the four indicators individually, the number of uses per patient was counted and expressed as an average for the MD group and for the MD-NP group.

The first indicator was nonroutine visits by physicians for episodic care. Use of the NP within the MD-NP team for patient assessment in lieu of the MD could reflect a potential cost savings because the rates of reimbursement differ for MDs and NPs. For example, in the state of Oregon, Medicaid has established rates for NPs which are approximately 80% of the rates for physicians. Increased use of NPs could potentially decrease the cost of care to Medicaid up to 20%. For the purposes of this study, it was assumed that all progress notes resulted in a fee for service. However, this could vary depending on the contractual arrangements between the members of the MD-NP team.

The second indicator was utilization of ambulance transportation to obtain health care. Pepper et al. (1978) and Kane (1976 and 1974) found a decreased use of ambulances in their studies of health care provided by an MD-NP team to ICFs. Exact rates of reimbursement to ambulance companies are based on the distance traveled portal-to-portal and the degree of emergency. This present study did not investigate actual rates. Incidence of use per each subject in the sample was counted.

The third and fourth indicators were utilization of the emergency room and hospitalization for nonelective reasons. Again, Pepper et al. (1978) and Kane (1976 and 1974) found a decrease in the use of a hospital for subjects under the care of an MD-NP team. In the present study, the incidence of use of the emergency room and the number of hospital days used were counted to obtain the score.

Since there was a wide variety of health-care needs, it was anticipated that there would be a wide variety of use by the subjects on the four indicators. Comparison was made based on the frequency of use of the indicators. It was assumed that the lower the score, the lower the utilization on the four indicators of health-care services.

Extraneous Variables

Impacting extraneous variables were anticipated in the patient population. Demographic data were gathered in the areas of

age, sex, marital status, personal support system, mode of financial support, primary diagnosis, number of chronic diseases and impairments, and ability to care for self mentally and physically. In order to control for differences between the groups, comparisons were made as described previously.

Data Collection Procedures

Letters requesting permission to conduct the study within the specific ICFs were submitted to the administrators of the ICFs (Appendix I). Anonymity was assured through the use of code numbers.

The period studied was the two-year period from January 1979 through December 1980. Data were collected by this investigator through a retrospective chart review for a period of 12 months for each selected subject.

Data Analysis

The interval level data on the quality of health care and utilization of health-care services were tested using the t-test with the level of significance set at 0.05. The control measures for differences between the two groups on the demographic variables (e.g., age and diagnosis) were tested using either the chi-square or t-test (depending on the kind of data) with the level of significance set at 0.05.

CHAPTER III

RESULTS

The results of this study include data on: (a) measurement of health care provided by MDs and MD-NP teams to geriatric patients in LTCFs and (b) utilization of expensive health-care services by MDs and MD-NP teams in the health care of LTCF geriatric patients.

Quality of Health Care

Data were collected on the quality of health care as provided to geriatric patients in LTCFs by MDs and MD-NP teams. This quality of care was measured by health-care provider-compliance as documented by a chart audit which used standards designed to meet the maintenance and episodic health-care needs of the institutionalized elderly. It was hypothesized that there would be no difference between the health care provided by the MD-NP teams (the study group) and the MDs (the comparison group). The health care was subdivided into two major areas: (a) maintenance health care and (b) episodic health care. Each area was scored separately as previously described. The data collected on the two groups' scores were assumed to be at the interval level. Therefore, a difference-of-means test was used to test the hypotheses. A two-tailed t-test statistic with

58 degrees of freedom was used with the level of significance set at 0.05.

Maintenance Health Care

Raw data on the percentages of provider-compliance with standards of maintenance health care showed a large difference between the two groups on several standards. Calculation of the total maintenance-care data yielded a t-test value of 5.48, which is significant beyond the 0.001 level of significance. As Table 2 shows, the MD-NP teams scored significantly higher on attainment of standards than the MDs.

TABLE 2

Mean Percentages of Provider-Compliance with Standards for Maintenance Health Care (as documented)

Group	$\bar{X}\%$	SD ⁺	df	Computed <u>t</u> -value
MD-NP teams	87.07	8.44	58	5.48*
MDs	75.73	7.55		

*p < 0.001

Episodic Health Care

Raw data on the percentages of provider-compliance with the standards of episodic health care also revealed large differences on several standards. Calculation of the total episodic-care data yielded a t-test value of 7.94, which is significant beyond the 0.001

level of significance. As Table 3 shows, the MD-NP teams scored significantly higher on attainment of standards than the MDs.

TABLE 3
Mean Percentages of Provider-Compliance with Standards for
Episodic Health Care (as documented)

Group	$\bar{x}\%$	SD ⁺	df	Computed t-value
MD-NP teams	71.40	10.74	58	7.94*
MDs	47.03	12.91		

* $p < 0.001$

Differences in Use of Individual Standards

In order to determine specific areas of differences in overall scores between the MD-NP and MD groups, comparison of scores on standards pertinent to medical, nursing, and combined medical and nursing services was done.

Data collected on standards for maintenance and episodic health care by general area (as discussed earlier and shown in Appendix F, Table 21) were compared. Large differences greater than 10% were arbitrarily judged to be significant in terms of patient care. Table 4 summarizes these differences on the 21 maintenance health care standards. Of the 11 standards pertinent to both medical and nursing services, there were large differences on 5 of the standards (or 45%). Of the four standards pertaining to nursing services only, there were large differences on two standards (or

50%); and of the six standards pertaining to medical services only, there were large differences on two of the standards (or 33%). In all instances the MD-NP teams scored higher.

TABLE 4

Differences $\geq 10\%$ of Actual Attained Scores on Standards of Maintenance Health Care by Group within Health-Care Service Area

Maintenance health-care standard #	Content of standard	Group	
		MD-NP teams	MDs
Standards pertaining to medical and nursing services combined			
	Data base		
2	History & physical examination	95%	85%
3	Exam accomplished within 5 days	93%	80%
6	Discharge summary	70%	58%
	Care Plans		
16	Psychosocial	37%	23%
	Outcome		
26	Progress notes	97%	81%
Standards pertaining to nursing services only			
22	Patient education	26%	14%
25	Patient-care conferences	27%	3%
Standards pertaining to medical services only			
	Data Base		
11	Annual reassessment	45%	25%
19	Medication surveillance	83%	71%

Large differences between the two groups on the 15 episodic health care standards are summarized in Table 5. On the 9 standards pertaining to both medical and nursing services, there were large differences on 6 of the standards (or 67%). On the three standards

pertaining to nursing services only, there was a difference on one of the standards (or 33%). In all instances, except assessment by telephone, the MD-NP teams scored higher.

TABLE 5

Difference \geq 10% of Actual Attained Scores on Standards of Episodic Health Care by Group within Health-Care Service Area

Episodic health-care standard #	Content of standard	Group	
		MD-NP teams	MDs
Standards pertaining to medical and nursing services combined			
	Data Base		
12	Assessed by visit	51%	29%
20	Assessed by telephone	20%	43%
14	Problem diagnoses	65%	33%
	Care Plans		
16	Psychosocial	100%	50%
	Outcome		
27	Outcome of physical care plan	71%	46%
28	Update in care plan	80%	46%
Standards pertaining to nursing services only			
22	Patient education	13%	2%

Initiation of health-care assessment occurred in two ways. First, the LTCF staff noted a change and informed the health-care provider, which resulted in a nonroutine assessment by telephone or visit. Second, the health-care provider could note a change during a routine visit with assessment made at that time. The MD-NP team assessed 172 new health problems by telephone or nonroutine visits and 69 new problems were identified during routine visits, for a

total of 241. The MDs assessed 150 new health problems by phone or nonroutine visits and 57 problems during routine visits for a total of 207 new problems.

Utilization of Expensive Health-Care Services

It was hypothesized that there would be no difference between the MD-NP teams and the MDs in the utilization of health-care services measured by the four indicators. A two-tailed t-test with 58 degrees of freedom was used to test this hypothesis, with the level of significance set at 0.05. The number of uses per patient in each group was used as the unit of analysis; thus, the data were treated as interval level. Calculation of the t-test statistic for frequency of nonroutine visits by the MDs and MD-NP teams (including NP visits) yielded results which were not significant beyond 0.05 (see Table 6). However, calculation by t-test for frequency of nonroutine physician visits only (excluding NP visits) yielded a value of 2.14 which is beyond the 0.05 level of significance (see Table 7). The actual number of nonroutine visits was 85 for the MDs and 94 for the MD-NP teams, which included 47 for the MDs in the team.

Calculation by t-test for the emergency room data yielded a value of 2.464, which is beyond the 0.05 level of significance. As Table 8 shows, the study group (the MD-NP teams) did not use the

emergency room as contrasted to five incidents of use by the comparison group (the MDs).

TABLE 6

Average Frequency of Use Per Subject of Nonroutine Visits
Including NP Visits

Group	\bar{X}	SD ⁺	df	Computed <u>t</u> -value
MD-NP teams	3.13	2.93	58	0.44*
MDs	2.83	2.28		

*NS

TABLE 7

Average Frequency of Use Per Subject of Nonroutine Visits
Excluding NP Visits

Group	\bar{X}	SD ⁺	df	Computed <u>t</u> -value
MD-NP teams	1.57	2.25	58	2.14*
MDs	2.83	2.28		

*p < 0.05

TABLE 8

Average Frequency of Use Per Subject of Emergency Room

Group	\bar{X}	SD ⁺	df	Computed <u>t</u> -value
MD-NP teams	0	0	58	2.46*
MDs	0.17	0.38		

*p < 0.05

Calculation of t-test values for the remaining two indicators, ambulance transportation and hospitalization for nonelective purposes, yielded results which were not significant beyond the 0.05 level of significance (see Appendix J, Tables 22 and 23, for computations). Therefore, there were significant differences between the two groups in terms of utilization of expensive health-care services on two of the four indicators measured.

To summarize, the quality of health care scores for both maintenance and episodic health care showed that the MD-NP teams scored significantly higher on the attainment of standards than the MDs. Differences $\geq 10\%$ of the actual attained scores on the health-care standards were found in all three specific areas of medical, nursing, and combined medical and nursing health care services. It was also found that the MD-NP teams used nonroutine MD visits less than the MDs alone did; and the teams did not use the emergency room, while the MDs did.

CHAPTER IV

DISCUSSION

The results of this study indicated that the MD-NP teams scored significantly higher than the MDs on the chart audit designed to measure the quality of health care provided to geriatric patients in LTCFs. Statistical testing of the null hypotheses yielded values on both episodic and maintenance health care which were significant beyond $p = 0.001$. Therefore, the MD-NP teams documented more elements of health care provided to LTCF patients than MDs alone. The assumption in use of the audit was that the more elements of health care offered and documented, the more comprehensive the actual health care.

Comparison with Review of Literature

There have been only a few studies which investigated the MD-NP team effect on the quality of health care provided to LTCF geriatric patients, with data provided only by Gerdes and Pratt (1979) in the Mountain States Health Corporation report. Even in the absence of data, conclusions were advanced by many researchers as previously discussed.

This study found highly-significant differences between the scores of the MD-NP teams and MDs on the chart audit measuring quality of health care. This finding is contrary to Lowenthal and Breitenbucher's (1975) results and supports Brody et al.'s (1975) conclusions of higher quality medical care resulting from the team effort. However, the term "medical care" is not applicable to this study since all subjects received medical care from physicians, but the study group also received nurse practitioner care. It can be concluded that the improvement in scores (11% higher for maintenance health care and 24% for episodic health care by the MD-NP teams) are attributable to the additive and complementary effects of the NP within the team.

This study also found significant differences between MDs and MD-NP teams in the use of two out of the four expensive health-care services measured. Lowenthal and Breitenbucher (1975), Spector et al. (1975), Kane (1976), Gerdes (1978), and Loeb and Robison (1977) have explored the cost-effectiveness of NP use in caring for geriatric patients in LTCFs. Lowenthal and Breitenbucher and Spector et al. measured frequency of health-care visits (and cost of MD supervision), while Kane measured usage of transportation and hospitalization. This study combined these three indicators and added the use of the emergency room.

Despite the collaborative nature of the NP scope of practice, regulations require physician supervision of health care provided by

NPs to LTCF patients. One form of this supervision is the requirement of a physician's cosignature on all NP notation and orders, whether or not the NP holds his or her own prescriptive privileges. Therefore, this study viewed the NP as a member of the MD-NP team, meeting all federal and state requirements, and compared utilization of expensive health-care services as indicators of potential direct cost.

Duplication of health-care services which increases cost was an argument against the use of an NP cited by Spector et al. (1975). In the present study, statistical testing of the total number of episodic visits (94) made by the MD-NP teams and MDs (85) showed no significant differences in the total number of nonroutine visits. Included within the MD-NP team visits were those made by the NPs (47, or 50% of the total number of nonroutine visits). A large percentage of these NP visits were made by the one NP who was a student during part of the study period. The student status of this NP required that most of her visits be referred to the MD for medical supervision which skewed the data. However, even with the skewed effect, there was no significant difference between the two samples on the total number of nonroutine visits. Therefore, duplication of health-care services did not increase the potential cost in this study. Since only 50% of the MD-NP teams' nonroutine visits were made by the MD, this study substantiated Loeb and Robison's (1977) conclusion that a

major cost advantage of the team was the more effective use of physician's time.

On the use of the emergency room indicator, the MD-NP team did not use the emergency room while the MDs resorted to assessment of patient's health status by the emergency-room physician on five separate occasions. Findings of this study are contrary to Spector et al.'s (1975) and Lowenthal and Breitenbucher's (1975) conclusions of increased cost of health care as provided by an NP and supportive of Kane's (1976) and Gerdes's (1978) conclusions of decreased costs.

In summary, accepting the complex health-care needs of the elderly infirm in LTCFs (Libow, 1982; Brown, 1980; Kovar, 1977; Brocklehurst & Hanley, 1976), this study reinforced the positive trend found by Brody et al. (1976), Pepper et al. (1978), and Gerdes (1978) in improved quality of health care provided by MD-NP teams without increasing the cost.

Quality of Health Care

Comparison of the differences in scores on the quality of health care instrument between the two groups was made among general areas to which each standard pertained (i.e., medical, nursing, or medical and nursing combined) and between the two categories of health care as provided (maintenance or episodic). Scores on each subcategory within the two categories and the specific standards which were applicable to each are discussed as follows. Possible

explanations for the differences in scores on each subcategory are advanced.

As shown in Appendix F, Table 21, the standards in the testing instrument were divided into three general areas of health care (medical, nursing, or combined medical and nursing) and into categories of maintenance or episodic health care. Both maintenance and episodic health-care standards were divided into subcategories by content similarities. Scores on all applicable standards for each subject were expected to be 100% in order to meet federal and state regulations. It was beyond the scope of this study to determine causes for variation in the actual scores.

Maintenance Health Care

Of the data base, four standards pertained to medical care and the remaining seven pertained to both medical and nursing care. Differences in scores on individual medical standards varied from 0-20%. The higher scores were achieved by the MD-NP teams. The scores on the individual standards which apply to both medical and nursing care varied from 0-16%. With one exception (notation of mental status), the higher scores were achieved by the MD-NP teams. A possible reason for the higher MD-NP teams scores can be found in the scope and design of the NP practice which is additive and complementary to that of the MD. Skills such as history-taking and physical examination, which once were the exclusive domain of the

physician (as measuring blood pressure once was), now fall within the list of tasks which an NP is qualified to perform. Utilization of these NP skills by the MD increases the number of tasks which can be performed, are construed as additive, and reflect in the scoring.

The plans of health care are required by regulation for all patients on any admission. There were no differences in scores on physiological health care or rehabilitation planning. Both groups scored high on physiological and low on rehabilitation planning. This could have been the result of absence of a perceived patient need, failure to document the plan, and/or presence of severe residual or functional disability for which the rehabilitation potential was limited. Demographic data revealed that 83% of the subjects in the MD-NP sample and 73% of the subjects of the MD group had some degree of inability to care for self physically on admission. This suggests the possibility of omission of a plan of care for rehabilitation due to a reduced rehabilitation potential. Further study that would include the physician's stated rehabilitation potential would be useful in determining possible causes for the overall scores. Average scores on psychological health-care planning differed greatly between the two groups. Although both groups obtained overall low-compliance, the MD-NP teams did score higher. Surprisingly, many of the subjects were admitted to the LTCF during the early 1970s, before the present increased focus on psychosocial health care. Since data were extracted from

admission notation, a downward scoring effect was not surprising. Other reasons for the low-compliance rate could have resulted from the absence of a perceived patient need, reliance on the LTCF's social worker to meet the patient's psychosocial needs, failure to document the plan, or the presence of severe organic brain syndrome possibly construed as a physiological problem. Demographic data did demonstrate that 73% of the subjects in the MD group and 87% of the subjects in the MD-NP group had chronic organic brain syndrome to some degree as a primary or secondary diagnosis.

There were four standards dealing with patient and family education and counseling along with LTCF staff education. All of these standards pertained primarily to nursing services. Scores of both groups on all of the standards were low. This was particularly true for patient counseling and family inclusion in care planning. There were two areas where there was a large difference between the MD-NP and MD groups. One area was related to patient education and the other was related to conferences with the LTCF staff on patient care. Both of these activities are part of the professional nurse's scope of practice and may not be typically included in the physician's scope of practice.

Measurement of the outcome of maintenance health care was represented by one standard which applied to all subjects and was pertinent to both medical and nursing health care. This standard (presence of routine progress notes) could be a measure of outcome

only if documentation was present. Progress notes were expected to include a response on the appropriate type of health-care plan as well as noting improvement in, maintenance of, or deterioration in health status. As stated earlier, "status quo" was interpreted as the necessary minimal charting regarding maintenance of health status. From this minimal statement, only inferences could be made regarding physical, psychosocial, and rehabilitative health-care needs. Both groups scored high on this measure. However, the MD-NP team scored significantly higher than the MDs. Further, from a nursing point of view, the progress notes of the NPs tended to be longer and more detailed than the MDs' notes.

Episodic Health Care

Assessment of an observed change in any patient's health-status was represented by four standards. Assessment patterns of the MD-NP teams and the MDs differed as follows. Telephone assessments of new problems were practiced 50% of the time by the MD group but only 29% of the time by the MD-NP teams. Differences in the two methods of practice could be attributable to the use of the additive skills of the NP to assess and triage episodic health-care problems, different philosophies of health-care practice, the full waiting room of the MD, and/or patterns of reliance on the LTCF nursing personnel for patient assessment.

Although the sizes of the two samples were the same and the subjects within the samples were comparable on eight of nine characteristics, the MD-NP teams identified more health-care problems than the MDs. This could have been the result of the more frequent visits made by the teams, more unstable health needs of subjects in the MD-NP team sample, or more nursing problems identified.

Care planning for episodic health-care needs used the same three standards as maintenance health care. There was no significant difference between the scores.

An interesting observation springs from the comparison between the total number of new problems noted for episodic care and the total number of new problems documented on the care-planning standards. For the MD-NP teams, 241 new problems were noted for episodic care, while 251 new problems were noted for the care plans. For the MD group, 207 new problems were documented for episodic care, while 166 new problems were noted for the care plans. Possible reasons for this difference in documentation could be found in the increased use of telephone assessment of new problems by the MD group, the less frequent actual visits to the LTCFs by the MD group, and/or decreased documentation of psychosocial plans of care for episodic problems by the MDs. This could have been due to the often-heard view that psychosocial problems, such as anxiety and combativeness, are physiological problems for which medication could be useful. No data were collected to determine which problems had

been deleted from the total number of assessments or the total number of care plans. Other reasons for differences in scores on episodic plans of care are similar to those for maintenance health care.

There were five standards used to measure the outcomes of episodic health care. Again, these standards could measure outcome only if charted. One standard was pertinent to nursing health care services, while the remaining four standards were pertinent to both medical and nursing care. Findings showed the MD-NP teams documented outcomes of physiological plans of care more frequently than MDs.

In summary, the scores for the MD-NP teams on the quality of health care instrument were generally higher than those of the MDs alone for maintenance and episodic health care. Large differences appeared in all three general areas of health care services--medical, nursing, and combined. In all instances, the MD-NP teams scored higher. It can be concluded that the improved scores were the direct result of the combined nursing and medical health care provided by the MD-NP team.

Methodological Issues

In terms of the methodological approach of this study, the inability to randomly assign the MD-NP teams to settings, as well as the inability to randomly assign subjects to the samples, could have resulted in dissimilar groups. Comparison of the subjects in the two groups on the nine characteristics which comprised the demographic

data revealed no gross dissimilarities. Chi-square testing of the data yielded no significant differences between the two samples on seven of the nine characteristics at the 0.05 level of significance. The difference between the samples on the sex distribution and total number of diagnoses may have been the result of the draw since the p-value calculated was 0.04 for the distribution of males and females in the sample and the t-test value on the number of diagnoses was 0.08. Therefore, the findings from the statistical comparison of the demographic characteristics of the sample showed that the two samples were roughly the same.

Other possible reasons for the difference in scores on the instrument could have been the presence of bias in the testing tool itself focusing more on nursing care. As shown in Appendix F (Table 21), if there was any bias within the testing instrument, it was slightly toward medical health care. This conclusion is supported by the fact that at the general level of distribution of standards, slightly more standards were pertinent to medical services than to nursing services. Within the maintenance health-care category, there were six standards pertinent to medical services as opposed to four standards pertinent to nursing care. Within the episodic health-care category, the distribution of standards was equal.

However, it should be noted that the reliability of the tool has not yet been established. Yet, the standards for the instrument were taken, in great part, from previously established standards of

care and content validity was established by a panel of experts; construct validity was not established.

Additional possible explanations for the difference in the scores between the two groups could have been bias resulting from the investigator who is an NP or variation in rating. Since all data were retrieved by a single investigator, systematic bias may have been introduced. During the data collection period of two months, any variation in subjective interpretation of documentation could have influenced objective scoring, but interpretation of the written record for compliance to any of the standards was based on minimal charting. Use of a chart audit as a measure of quality of health care introduces the problem of omission. Individual variation in interpretation (by the provider) of what was necessary to document also may have influenced the scores. Only repeated testing of the instrument by various researchers can establish the reliability along with the content and construct validity of this tool.

In summary, there was no increased use by the MD-NP teams of the four expensive health-care services measured in this study. Concerns regarding duplication of services through the use of NP services were not demonstrated by the data collected. Although practice designs of the specific MD-NP teams were not studied, the high percentage of use of NP services within the MD-NP teams offers a potential direct cost savings. Since there was no increase in utilization of expensive health-care services and there was a

measurable improvement in the quality of health-care documented, it can be concluded that the MD-NP team is a viable economic alternative to the traditional medical model.

CHAPTER V

SUMMARY

There is an increase in the size and complexity of the problem of providing high-quality, cost-effective health care to geriatric patients in LTCFs. As the expected life span becomes longer, the actual number of individuals, comprising the 5% of the elderly infirm who require LTCF placement at some time in their lives, becomes greater. The multiple age-related, mental, and/or physical health needs of the LTCF geriatric patients may not be met by the present level of mandated health-care providers. Federal and state regulations stipulate a minimum number of nursing personnel and medical services to meet the health-care needs of the patients. Nursing services are mainly provided by non-licensed personnel and medical services are required at a frequency which is widely unmet. One remedy proposed for these problems has been the use of the physician-nurse practitioner team in the health care of these patients. Very little research has been done to evaluate the performance of the MD-NP team in providing quality health care in LTCFs.

By means of a posttest only, control group design, this study

evaluated the performance of the MD-NP team approach in the health care of geriatric patients in LTCFs by means of a retrospective chart audit over a twelve-month period. The quality of maintenance and episodic health care was measured on an instrument especially designed for this study which used fixed standards of medical, nursing, and combined services. The standards also combined the elements of the process of care which are assessment, planning, implementation, and evaluation. The study group was composed of 30 randomly-selected medical records of subjects under the care of MD-NP teams, 10 from each of the 3 ICF settings. The comparison group was composed of 30 medical records of subjects under the care of MDs alone, 10 from each of the 3 ICF settings. All subjects were older than age 64 and had lived in an ICF for at least 12 months. Demographic data were collected to compare the two nonequivalent samples and statistically tested by the chi-square or t-test statistic. The quality of health care data were tested by Student's t-test for small samples.

A second portion of the study, using the same samples and settings, measured the utilization of four expensive health-care services by MD-NP teams and MDs alone, by means of a chart audit. Data collected were tested using Student's t-test for small samples.

Results, as measured by the record audit, indicated that the MD-NP teams provided a significantly-greater quality of health care than the MDs without an increase in utilization of expensive

health-care services. Use of NP services did not detract from the quality of care but, rather, contributed significantly to the scores which represented the quality of care. There was no evidence of duplication of medical services.

Limitations of the Study

This research was limited by the posttest-only design, the small sample size, and the inability to randomly assign subjects to the samples or the MD-NP teams to the settings. Further, use of documentation within the medical record as a measure of the actual care provided is a major limitation. Yet, it is still possible to draw a correlation between care-provided and care-documented. The greater the number of care-components documented, the more likely that more comprehensive care is actually provided. The greater the score on an individual component of care, the more likely that more comprehensive care is actually provided on that component.

The restriction placed on the selection of subjects at the outset of the study--"living 12 months in an LTCF"--to form the available population from which the sample was drawn, limited the study to those subjects who were basically "survivors." Further study without this restriction would be helpful.

The use of a testing instrument without established reliability and validity was a further limitation of this study.

Implications of the Study

Evaluation of the MD-NP team approach on the health care of geriatric patients in the LTCFs studied indicated an improved quality of health care without an increase in the potential cost of that care. If this effect is generalizable to more than the available study population, the quality of health care provided to geriatric patients in LTCFs can be increased without increasing cost. Indirect cost savings resulting from more efficient use of physicians' time and skills could assist in containing costs of the health care presently provided to LTCF geriatric patients.

At another level, the clearer definition of the role of the NP in LTCFs as a bridge between the medical and nursing professions emerges from this research. Tasks which both professions hold in common are not unnecessary duplication but rather an improvement in patient health care resulting from the complementary professional approaches of the MD and NP within the team.

A final implication of the study is through the development of a testing instrument which may measure quality of health care provided by an NP or MD against fixed standards of patient assessment, care planning, implementation, and evaluation for both medical-care and nursing-care services for maintenance and episodic incidences.

Recommendations for Further Study

Given the highly-significant findings of this study, more data will be necessary to validate the results and increase the generalizability of the findings. Studies using different types of settings or exploring different types of MD-NP team practice designs would enlarge the present limited body of knowledge pertaining to the health care provided to geriatric patients in LTCFs by MD-NP teams.

This study examined the quality of health care as measured by the documentation in the medical records. Recommendations for further research would be to use other types of health-care measures, particularly those of outcome, and observation of direct care by providers.

This study also examined utilization of four expensive health-care services as a factor in potential direct cost savings in patient care. Recommendations for further research would be to measure actual direct cost on the indicators used in this study or investigate other cost indicators such as medication, laboratory, and consultant usage. It would also be useful to study the percentage of use of NP services within the team for maintenance health care as an added potential direct cost savings. Additionally, it is recommended that indirect cost measures, such as the effect of the MD-NP team on LTCF staff education and any resultant improved LTCF nursing personnel performance, be studied.

The instrument developed for this study measured the process of health care as documented. The standards relating to laboratory and consultant use were not sufficiently defined. Recommendations for future research would be clarification of the actual appropriate use of these standards. Additionally, the lack of clear-cut epidemiological standards of outcomes of health care for LTCF geriatric patients is a major barrier to predicting response to health care. Research in this area would be of major assistance.

Finally, this study measured health care provided by only three MD-NP teams without identifying characteristics of those teams which may have influenced the findings. Recommendations for further research would be to examine the characteristics of the MDs who work with NPs, the characteristics of the NPs themselves, the perception of the NP role by the physician in the team, the degree of acceptance of the team approach by the LTCF nursing personnel, as well as the type of patients who accept care from an MD-NP team.

REFERENCES

REFERENCES

- Abdellah, F. G. A nationwide study to evaluate the care of patients in nursing homes. Public Health Reports, 1977, 92 (1), 30-32.
- Aiken, L. H. Nursing priorities for the 1980s: Hospitals and nursing homes. American Journal of Nursing, 1981, 81 (2), 324-330.
- Altieri, A. J., Sedutto, M. E., Feder, H. M., & Weissman, M. S. Developing quality long-term care. Geriatrics, 1977, 32 (7), 126-142.
- American Nurses Association. Standards of gerontological nursing practice. 1973. (a)
- American Nurses Association. Standards of nursing practice. Publication #NP-41, 1973. (b)
- American Nurses Association. Supporting paper #4. 94th Congress, 1st Session, 1975.
- Beck, C. Mental health and the aged: A values analysis. Advances in Nursing Science, April 1979 (1), 79-87.
- Brocklehurst, J. C. & Hanley, T. Geriatric medicine for students. London: Churchill Livingstone, 1976.
- Brody, S. J., Cole, L., Storey, P. B., & Wink, N. J. The geriatric nurse practitioner: A new medical resource in the skilled nursing home. Journal of Chronic Disease, 1976, 29 (8), 537-543.
- Brown, M. M. The need for reallocation of health resources. Nursing Homes, 1980, 29 (1), 12-15.
- Burnside, I. M. Psychosocial nursing care of the aged. New York: McGraw-Hill, 1980.

- Edmunds, M. Financial concerns of nurse practitioners. The Nurse Practitioner, 1980, 5 (4), 33-51.
- Foley, W. J., Mengr, M. S., & Schneider, D. P. A comparison of the level of care predictions of six long-term care patient assessment systems. American Journal of Public Health, 1980, 70 (11), 1152-1161.
- Freund, C. M., & Overstreet, G. A. The economic potential of nurse practitioners. The Nurse Practitioner, 1981, 6 (2), 28-32.
- Gerdes, J. W. Geriatric nurse practitioners: Key in improving quality care. Oregon Nurse, 1978, 43 (5), 8-9.
- Gerdes, J. W., Monley, S., & Pratt, S. C. Using nurse practitioners to improve care. American Health Care Association Journal, 1977, 7 (3), 24-26.
- Gerdes, J. W., & Pratt, S. C. In anticipation of the geriatric nurse practitioner. The Nurse Practitioner, 1978, 3 (6), 14-39.
- Gerdes, J. W., & Pratt, S. C. Improving quality care in the skilled nursing facility in the rural mountain west. (A final report submitted by the Mountain States Health Corporation.) Boise, ID: Mountain States Health Corporation, 1979.
- Gress, L. D. The roles and relationships of the nursing and interdisciplinary teams. American Health Care Association Journal, 1978, 4 (3), 28-30.
- Kane, R. J. Can nursing home care be cost effective? Journal of the American Geriatrics Society, 1974, 22 (6), 265-272.
- Kane, R. J. Is good nursing-home care feasible? Journal of the American Medical Association, 1976, 235 (5), 516-519.
- Kleinman, L., & Sullivan, T. J. A gerontologic nurse practitioner program. Nursing Clinics of North America, 1979, 14 (1), 641-651.
- Kovar, M. G. Health of the elderly and use of health services. Public Health Reports, 1977, 92 (1), 9-20.
- Libow, L. S. Geriatric medicine and the nursing home: A mechanism for mutual excellence. The Gerontologist, 1982, 22 (2), 134-141.

- Loeb, P. M., & Robison, B. J. Experience of a physician-nurse practitioner team in care of patients in SNFs. The Journal of Family Practice, 1977, 4 (4), 727-730.
- Lowenthal, G., Jr., & Breitenbucher, R. The geriatric nurse practitioner's value in a nursing home. Geriatrics, November 1975, 87-91.
- Medicare/Medicaid skilled nursing facility survey report. Form HCFA-1369, November 1976.
- Mitchell, J. B. Physician visits to nursing homes. The Gerontologist, 1982, 22 (1), 45-48.
- Multnomah County Department of Human Services (Nursing Home Assessment Team). Nursing Home Assessment Project (report presented to Hugh H. Tilson). Portland, OR: Multnomah County Department of Human Services, 1977.
- Oregon Administrative Rules. Chapter 333, Division 23, Health Division, 1980. (333-23-751)
- Oregon Regulatory Statute #678. 1980.
- Pepper, G. A., Kane, R., & Teteberg, B. Geriatric nurse practitioner in nursing homes. American Journal of Nursing, 1978, 76 (1), 62-64.
- Prescott, P. A., & Driscoll, L. Evaluating nurse practitioner performance. The Nurse Practitioner, 1980, 5 (4), 28-32.
- Rossmann, I. (Ed.). Clinical geriatrics. Philadelphia, PA: J. B. Lippincott, 1971.
- Runyon, J. W., Jr. The Memphis chronic disease program. Journal of the American Medical Association, 1975, 231 (3), 264-267.
- Simborg, D. W., Starfield, B. H., & Horn, S. D. Physicians and non-physician health practitioners: The characteristics of their practices and their relationships. American Journal of Public Health, 1978, 68 (1), 44-48.
- Solon, J. A. Facing challenges in service-related research on aging. American Journal of Public Health, 1977, 67, 328.
- Sox, H. C., Jr. Quality of patient care by nurse practitioners and physician's assistants: A ten-year perspective. Annals of Internal Medicine, 1979, 91 (3), 459-468.

- Spector, R., McGrath, P., Alpert, J., Cohen, P., & Aikins, H. Medical care by nurses in an internal medicine clinic: Analysis of quality and its cost. Journal of the American Medical Association, 1975, 232 (12), 1234-1237.
- Spitzer, W. O. The Burlington randomized trial of the nurse practitioner. New England Journal of Medicine, January 1974, 31, 251-256.
- United States Department of Health, Education, and Welfare. Long-term facility improvement study (introductory report). Washington D.C., 1975.
- United States Senate Subcommittee on Aging. Nursing home care in the United States: Failure in public policy (supporting paper #4). Washington D.C.: United States Government Printing Office, 1975.
- W. K. Kellogg Foundation. Physicians' boon and patients' blessing: The geriatric nurse practitioner. Profiles, 1981, 4 (1), 2-7.
- Wolfer, C. (Chair). Report of the joint interim task force on nursing homes. (Submitted to members of the 60th Legislative Assembly, in accordance with Senate Joint Resolution 56, 59th Legislative Assembly.) Salem, OR: State of Oregon, 1978.
- Zimmer, J. G. Medical care evaluation studies in LTCF. Journal of the American Geriatrics Society, 1979, 17 (2), 62-72.

APPENDICES

APPENDIX A

DEMOGRAPHIC DATA INSTRUMENT

Setting code number _____ Subject code number _____

1. Age: 65-74 _____ 75-84 _____ 85-94 _____ over 95 _____
2. Sex: Male _____ Female _____
3. Marital status:
 Never married _____ Married _____ Divorced _____ Widowed _____
4. Family visits:
 Daily _____ Weekly _____ Monthly _____ Never _____
5. Mode of financial support: Medicaid _____ Private _____
6. Primary diagnosis: _____
7. Number of chronic disease/conditions on admission (list all):
 1 _____, 2 _____, 3 _____, 4 _____, 5 _____, 6 _____, over 6 _____
8. Ability to care for self mentally:
- | | month 1 | | month 12 | |
|--------------------|---------|-------|----------|-------|
| | yes | no | yes | no |
| Alert: | _____ | _____ | _____ | _____ |
| Oriented to self: | _____ | _____ | _____ | _____ |
| Oriented to place: | _____ | _____ | _____ | _____ |
| Oriented to time: | _____ | _____ | _____ | _____ |
9. Ability to care for self physically:
- | | | | | |
|-------------------------|-------|-------|-------|-------|
| Able to do own bathing: | _____ | _____ | _____ | _____ |
| grooming: | _____ | _____ | _____ | _____ |
| dressing: | _____ | _____ | _____ | _____ |
| feeding: | _____ | _____ | _____ | _____ |
| transferring: | _____ | _____ | _____ | _____ |
| toileting: | _____ | _____ | _____ | _____ |
| ambulating: | _____ | _____ | _____ | _____ |

APPENDIX B

FREQUENCY DISTRIBUTION OF SUBJECTS:
MARITAL STATUS, FAMILY VISITS, MODE OF FINANCIAL SUPPORT, AND
ABILITY TO CARE FOR SELF MENTALLY AND PHYSICALLY

TABLE 9

Frequency Distribution of Subjects:
 Marital Status, Family Visits, Mode of Financial Support, and
 Ability to Care for Self Mentally and Physically

Characteristic	Number of subjects by group	
	MD-NP teams	MDs
Marital status		
Single/Divorced	7	9
Married	4	6
Widowed	19	15
Family visits		
Yes	13	19
No	17	11
Mode of financial support		
Private	6	9
Medicaid	24	21
Ability to care for self mentally		
Yes	4	8
No	26	22
Ability to care for self physically		
Yes	8	5
No	22	25

APPENDIX C

CHI-SQUARE AND t-TEST COMPUTATIONS OF
DEMOGRAPHIC DATA BY INDIVIDUAL CHARACTERISTICS

TABLE 10
Distribution of Subjects by Age

Age	% of subjects by group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
65-74	50	50	100	14	2	0.10*
75-84	47	53	100	15		
≥ 85	52	48	100	31		

*NS

TABLE 11
Distribution of Subjects by Primary Diagnosis

Primary diagnosis	% of subjects in group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Cardiovascular	54	46	100	35	1	0.62*
Other	44	56	100	25		

*NS

TABLE 12
Distribution of Subjects by Sex

Sex	% of subjects by group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Male	67	33	100	24	1	4.44*
Female	39	61	100	36		

*p < 0.05

TABLE 13

Distribution of Subjects by Total Number of Diagnoses
Per Subject (Chi-Square)

Total number of diagnoses	% of subjects in group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
< 8	40	69	100	43	1	5.64*
> 8	69	31	100	17		

* $p < 0.05$

TABLE 14

t-Test for Differences in Mean Total Number of
Diagnoses Per Subject

Group	\bar{X}	SD ⁺	<u>df</u>	Computed <u>t</u> -value
MD-NP teams	7.23	3.27	58	0.75*
MDs	6.63	2.89		

*NS

TABLE 15

Distribution of Subjects by Marital Status

Marital status	% of subjects by group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Single/Divorced	44	56	100	16	2	1.14*
Married	40	60	100	10		
Widowed	56	44	100	34		

*NS

TABLE 16

Distribution of Subjects by
Mode of Financial Support

Mode of financial support	% of subjects by group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Private	40	60	100	15	1	0.46*
Medicaid	43	47	100	45		

*NS

TABLE 17

Distribution of Subjects by Family Visits

Family visits	% of subjects by group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Yes	37	63	100	30	1	2.40*
No	57	43	100	30		

*NS

TABLE 18

Distribution of Subjects by Ability
to Care for Self Mentally

Ability	% of subjects in group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Yes	33	67	100	12	1	1.10*
No	54	46	100	48		

*NS

TABLE 19

Distribution of Subjects by Ability
to Care for Self Physically

Ability	% of subjects in group			<u>n</u>	<u>df</u>	χ^2 value
	MD-NP teams	MDs	Total			
Yes	62	38	100	13	1	0.50*
No	47	53	100	47		

*NS

APPENDIX D

SOURCES OF SPECIFIC HEALTH CARE STANDARDS
FOR CHART AUDIT INSTRUMENT

TABLE 20
Sources of Specific Health Care Standards
for Chart Audit Instrument

Item #	Reference:		Instrument		ANASGNP Standard	Oregon NP Scope of Practice OAR #
	Medical: FRS #	RSR #	CFR #	Nursing: RSR #		
1.	405.1123	F101	----	----	----	----
2.	"	F102	405.1132 *	F356	#1	678.
3.	"	F109	"	"	"	"
4.	"	F107	405.1124	F170	#2	"
5.	"	F103	----	----	"	"
6.	405.1132 *	F346	405.1132 *	F346	#1	"
7.	"	"	"	"	"	"
8.	405.1123	F107	405.1124	F171	"	"
9.	"	"	"	"	"	"
10.	405.1130	F104	"	F175	#3, #4	"
11.	405.1123	F103	----	----	----	"
12.	"	F107	----	----	----	"
13.	"	F122	405.1124	F172	#2	"
14.	"	F107	----	----	----	"
15.	"	"	405.1124	F171	#2	"
16.	"	"	"	"	#3, #4	"
17.	405.1130	F310	405.1130 *	F316	"	"
18.	405.1123	F111	405.1124	F183	#5	"
19.	"	F107	----	----	----	"
20.	"	"	405.1124	F193	#7	"
21.	405.1126	F259	"	F175	----	"
22.	405.1121	F69	"	F136	#5	"
23.	----	----	----	----	----	"
24.	----	----	405.1121 **	F61	#6	"
25.	----	----	405.1124	F170	#3	"
26.	405.1123	F112	"	F172	#6	"
27.	"	F111	"	"	"	"
28.	"	"	"	"	"	"
29.	----	----	405.1121 **	F61	#7	"
30.	405.1123	F111	405.1124	F172	#2	"
31.	"	"	"	"	"	"

* Administrative medical records ORS number

** Administrative policy

ANASGNP = American Nurses Association Standards of Gerontological Nursing Practice (1973a)

CFR = Code of Federal Regulations

NP = Nurse Practitioner

OAR = Oregon Administrative Rules (1980)

RSR = Resident Service Review (Medicare/Medicaid Skilled Nursing Facility Report, 1976)

APPENDIX E

QUALITY OF HEALTH CARE CHART AUDIT INSTRUMENT

Category and Instructions	Standard	Month of Study	Health-Care Provider MD EP LCGP	care nurse	T.O.
#14. Notation of new diagnosis/problem written in progress notes (if Standard 12, then 14). #15. Notation of plan of care for patient's physiological problems with specific admission. (Note frequency of new plan of care.) #16. Notation of plan of care for patient's psychosocial needs with specific goals, priorities, approaches or admission. (Note frequency of new plan of care.) #17. Notation of plan of care for patient's rehabilitation needs with specific goals, priorities, approaches or admission. (Note frequency of new plan of care.) #18. Notation of medication/treatment review every 30 days. (Expected frequency is one check for each month.)		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
Planning Instructions: if Standard 14, then check at applicable plan in 15 through 17.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#19. Notation of laboratory surveillance of medication appropriateness to medication requirements. Number of applicable applications; (Expected frequency is one check for each applicable medication per year.)		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#20. Notation of resolution/disposition of social health problem of patient.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#21. Notation of resolution/disposition of epidemic assessment or physical health problem of patient.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#22. Notation of update in care plan with patient, based on level of progress.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#23. Notation of patient/family inclusion in identification of new goals and priorities.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
#24. Notation of resolution/disposition of health problem of patient.		1			
		2			
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			

APPENDIX F

DISTRIBUTION OF HEALTH CARE STANDARDS
BY DISCIPLINE TO WHICH STANDARD IS PERTINENT

TABLE 21

Distribution of Quality of Health Care Standards
by Discipline to Which Standard is Pertinent

Level of distribution	Number of standards included	Discipline to which standard is pertinent		
		Medical	Nursing	Combined
General	31	9	5	17
Categories within general distribution				
Maintenance	21	6	4	11
Episodic	15	3	3	9
Subcategories within maintenance category				
Data base	11	4	---	7
Care planning	3	---	---	3
Management of medication	2	2	---	---
Education and counseling	4	---	4	---
Outcome	1	---	---	1
Subcategories within episodic category				
Assessment	4	3	---	1
Care planning	4	---	---	4
Education and counseling	2	---	2	---
Outcomes	5	---	1	4

APPENDIX G

CRITERIA USED IN DETERMINING APPLICABILITY OF STANDARDS

All standards which are applicable are to be checked as directed. Notation made by the NP must be cosigned by the MD to meet regulations. Use of a "c" in the MD column indicates the presence of the necessary cosignature. All of the standards may be met by cosigned NP notation except standard #1 which (for the purposes of this study) is defined as not applicable to the NP scope of practice.

Maintenance Health Care

Standards #1 through 10	are mandated on each admission for each patient. Multiple admissions require the equivalent number of uses of all of these standards.
Variations:	If admitted from a hospital, all standards are applicable. If admitted from another LTCF, standard #6 is not applicable. If admitted from home, standards #6 and 7 are not applicable.
Standard #11	is mandated annually.
Variation:	If any hospitalization and readmission to the LTCF occurs during the 12 months of the study period, this standard is not applicable.
Standards #15, 16, and 17	are mandated for each admission.

Standard #18	is mandated for each month of residence in a LTCF for an expected total of 12.
Standard #19	is applicable only for medications designated by MDs and pharmacists as requiring laboratory surveillance.
Standards #22 and 23	are applicable for each admission.
Variation:	If subject is oriented to self only, these standards are not applicable.
Standard #24	is applicable for each admission.
Variation:	If subject lacks family visits, this standard is not applicable.
Standard #25	is applicable for each admission.
Standard #26	is mandated with the expected frequency determined by the type of physician.
Variations:	Congregate-care physicians are required to make progress notes every 30 days for an expected total of 12. Noncongregate-care physicians are required to make progress notes every 60 days for an expected total of 6.

The score is the sum of the applicable standards checked (including multiple admissions duplication) divided by the number of applicable standards, yielding a percentage.

Episodic Health Care

For episodic care there are no expected totals except in terms of individual cases of need. For each new problem noted by the LTCF licensed nursing personnel, a judgment must be made regarding the nature and severity of the problem and the health-care provider informed. The health-care provider's assessment may be by visit (#12) or by telephone (#20). Scoring differs for each type of assessment.

If the problem is assessed by telephone, the expected flow of notation will be found initially on standard #12 by the LTCF licensed nursing personnel, then on telephone orders for medication or treatment (standard #20), then on a supporting diagnosis (standard #14), then on an appropriate plan of care (standards #15, 16, or 17), and finally on a progress notation during a follow-up visit and update of the plan of care (standard #28).

If the problem is assessed by means of a visit, the expected flow of notation will be found initially on standard #12 by the LTCF licensed nursing personnel, then notation of an episodic visit (standard #12), with possible use of diagnostic laboratory procedures (standard #13, not included in the final scoring), then a supporting diagnosis (standard #14), then an appropriate plan of care (standards #15, 16, or 17), then possible use of rehabilitation consultants (as applicable, standard #21), then patient education and counseling (standards #22 and 23), then updating the family of the change in the

patient's plan of care (standard #29), and finally notation of the outcome of the appropriate plan during a follow-up visit [standard #27 (plan #15), standard #30 (plan #16), or standard #31 (plan #17)].

Standard #12	is applicable for each new problem.
Variation:	If a need occurs on or about the time of a routine visit, an episodic visit may be substituted for a routine call.
Standard #13	is a variable dependent on a perceived need by the health-care provider.
Standard #14	is applicable for each new problem. The expected frequency of use is equivalent to #12 and #20.
Standards #15, 16, and 17	as in maintenance health care.
Standard #20	applicable to instances used by the LTCF nursing personnel.
Standard #21	is a variable dependent on a perceived need by the health-care provider. If standard #17 is used, this standard can be applicable.
Standards #22 and 23	as in maintenance health care.
Standard #27	the outcome of standard #15. Applicable to all instances whenever #15 is used.
Standard #28	applicable whenever #20 is used.

Standard #29	applicable to each episodic problem.
Variation:	If subject lacks family visits, this standard is not applicable.
Standard #30	the outcome of standard #16. Applicable to all instances whenever #16 is used.
Standard #31	the outcome of standard #17. Applicable to all instances whenever #17 is used.

The score is the sum of all the applicable standards checked for each incidence of episodic care divided by the number of applicable standards, yielding a percentage.

APPENDIX H

UTILIZATION OF EXPENSIVE HEALTH-CARE SERVICES INSTRUMENT

Setting code number _____ Subject code number _____ Notation of use = x

Month of Study	Indicator #1 Episodic assessment of physical and mental changes in health status of LTCF patients by: MD or NP	Indicator #2 Ambulance transportation to obtain health care.	Indicator #3 Emergency room use.	Indicator #4 Number of hospitalization days for nonelective reasons.
1.	_____	_____	_____	_____
2.	_____	_____	_____	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____
6.	_____	_____	_____	_____
7.	_____	_____	_____	_____
8.	_____	_____	_____	_____
9.	_____	_____	_____	_____
10.	_____	_____	_____	_____
11.	_____	_____	_____	_____
12.	_____	_____	_____	_____
TOTAL	_____	_____	_____	_____

MD = Physician
 NP = Nurse Practitioner
 LTCF = Long-Term Care Facility

APPENDIX I

SAMPLE LETTERS OF TRANSMITTAL AND CONSENT

Sample Letter of Transmittal

Elsie M. Balint, Research Investigator
10 Prall Lane
Eugene, Oregon 97405
344-4139

April 14, 1981

_____, Administrator
_____ Care Center

Re: Research Project: An Evaluation of the Physician-Nurse
Practitioner Team Approach in the Health Care of Long-Term Care
Facility Geriatric Patients

Dear _____:

My name is "Sue" Balint and I am conducting a research project as part of my master's program in Psychiatric/Mental Health Nursing at the Oregon Health Sciences University. I am also a geriatric nurse practitioner.

As you know, nurse practitioners have been working with physicians in a team approach to health care of patients in several long-term care facilities in Oregon over the past ten years. No data are available to evaluate the effectiveness of this approach to patient care. The purpose of my research is to evaluate the impact of the interdisciplinary team approach on the health care of geriatric patients in long-term care facilities. The research will be supervised by Christine Tanner, Associate Professor at the Oregon Health Sciences University School of Nursing.

I am asking for your participation in the research to the extent of allowing a review of the medical records of twenty patients who have lived in your facility for twelve months of the past two years. Confidentiality is assured by my professional ethics and anonymity will be guaranteed by use of code numbers.

I will be happy to answer any questions you may have regarding this study at any time.

Sincerely,

Elsie M. Balint, BA, RN, C

Sample Letter of Consent

September 3, 1981

Elsie M. Balint
Research Investigator
10 Prall Lane
Eugene, Oregon 97405

Dear Ms. Balint:

We are pleased to have you do a study in our Facility which will evaluate the Physician-Nurse Practitioner team approach in the Health Care of Long-term Facility Geriatric Patients.

As you and I have discussed, I have signed the consent form allowing this study, and read your letter of transmittal regarding this study. It is my understanding that the following conditions will exist.

1. The study will be supervised by Christine A. Tanner, PhD, RN (Faculty Supervisor) and Elsie M. Balint, RN, NP (Research Investigator).
2. The study will be conducted by means of a medical record review and that all information will be kept confidential by use of code numbers, rather than names.
3. I understand that I may discontinue this study at any time without affecting my relationship with other health care providers.

I feel this study is needed and would benefit the increased need for Nurse Practitioners in long-term care settings and would improve patient care.

Sincerely,

_____, Administrator

APPENDIX J

COMPUTATIONS BY t-TEST FOR INDICATORS OF UTILIZATION OF
EXPENSIVE HEALTH-CARE SERVICES

TABLE 22

Use of Ambulance Transportation in Health-Care Services

Group	\bar{X}	SD ⁺	<u>df</u>	Computed <u>t</u> -value
MD-NP teams	0.40	0.89	58	0.324*
MDs	0.47	0.78		

*NS

TABLE 23

Number of Hospitalization Days Used for Nonelective Purposes

Group	\bar{X}	SD ⁺	<u>df</u>	Computed <u>t</u> -value
MD-NP teams	2.37	5.90	58	0.160*
MDs	2.13	5.70		

*NS

ABSTRACT

AN ABSTRACT OF THE THESIS OF

ELSIE M. BALINT

For the MASTER OF NURSING

Date of Receiving this Degree: June 11, 1982

Title: AN EVALUATION OF THE PHYSICIAN-NURSE PRACTITIONER TEAM
APPROACH IN THE HEALTH CARE OF LONG-TERM CARE FACILITY
GERIATRIC PATIENTS

Approved:

Christine A. Tanner, RN, PhD, Thesis Advisor

An evaluation of the physician-nurse practitioner (MD-NP) team approach to providing high-quality, cost-effective health care to geriatric patients in long-term care facilities (LTCFs) was done. The study was conducted to address the questions of the quality of health-care services for both maintenance and episodic health-care needs. By means of a posttest only, control group design, this study examined the MD-NP team approach using a retrospective chart audit over a 12-month period. The quality of maintenance and episodic health care was measured on an instrument especially designed for this study, using fixed standards of both medical and nursing health care. The standards also combined the components of the process

variables within health care (that is, assessment, planning, implementation, and evaluation). Use of expensive health-care services was also evaluated.

The study sample was divided into: (a) the study group of 30 medical records of subjects under the care of an MD-NP team, 10 from each of the 3 ICF settings, and (b) a comparison group of 30 medical records of subjects under the care of physicians (MDs), 10 from each of the same 3 ICFs. The medical records were randomly selected with replacement to control for biases among the groups. The quality of health-care and utilization of expensive health-care services data were tested by Student's t-test with the level of significance set at 0.05. Demographic data were collected as an additional control of the nonequivalent samples and tested by the chi-square or t-test statistic with the level of significance set at 0.05.

Results as measured by the chart audit indicated that the MD-NP teams scored significantly higher than the MDs in both maintenance and episodic health care without an increase in utilization of expensive health-care services. Findings of 50% use of NP services for nonroutine visits led to the conclusion that increased use of NP services contributed significantly to the containment of cost of health-care services.