

A STUDY OF PRESCRIBING AND UTILIZATION PATTERNS IN  
THREE LONG - TERM CARE FACILITIES. UTILIZATION OF A  
CAPITATION FEE OR UNIT DOSE DRUG DISTRIBUTION UNDER THE  
TEXAS MEDICAID PROGRAM

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A Thesis  
Presented to  
the Faculty of the College of Pharmacy  
The University of Houston

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In Partial Fulfillment  
of the Requirements for the Degree  
Master of Science in Pharmacy

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by  
Roland A. Patry  
May 1977

## ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to Dr. Ruth C. Kroeger and Mr. Harold D. Hudson for their advice and encouragement during the preparation of this thesis.

I would like to thank Mr. Robert Hayes for his interest and continuous support throughout the study.

I am grateful to each member of my research committee for their support of and contributions to this study.

I would like to express my appreciation to Mr. Ralph M. Palmer for his invaluable assistance with the computer programming aspects of this study.

To my wife, I express my deepest appreciation for her tolerance, understanding, and assistance during the preparation of this thesis.

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## ABSTRACT

The increased longevity of the average American has helped make more visible the natural degenerative processes of the cellular components of the human body. Lay-terms such as "stroke" and "hardening of the arteries" define medical problems which may not have been prominent 200 years ago. To those individuals afflicted by debilitating medical problems, nursing home care is offered as a less expensive means to receive quality care. Unfortunately, Senate hearings on kickbacks, drug misuse and misappropriation of funds has tarnished the reputation of this health care industry.

This two phase investigation was conducted as a pilot study on prescribing habits and drug utilization and their relationships to the use of a capitation system or unit dose drug distribution system in Texas nursing homes.

This study was accomplished via retrospective chart reviews of 311 community nursing home residents and 71 residents of a Federal nursing home. The first phase of this study involved comparing drug utilization patterns, medical problems, and physician prescribing habits in the community nursing homes with those of the Federal facility. Arteriosclerosis, cerebrovascular accident, and organic brain syndrome were the most frequently diagnosed problems. Hypertension was not seen as a significant problem in the Federal facility. Variations existed between nursing homes as to the numerical ranking by frequency of orders for the most prescribed legend

medications. In all facilities, milk of magnesia, aspirin, or vitamins were the most commonly prescribed medications. For all of the study patients the number of doses consumed per patient per day was not significantly different between the study nursing homes, although a significant difference was observed between Home Y and Home Z in their intermediate care populations. Significant differences in the mean number of medication orders were observed between the skilled and intermediate care populations of the respective nursing homes. Analysis of the mean number of prescribed medication orders revealed that the majority of physicians in the study nursing homes prescribed, on the average, legend medications to be administered on a regular scheduled basis to their patients. The only exception was the physician from the Federal facility who prescribed, on the average, more non-legend medications per patient than legend medications. The frequency of prescribed pro re nata (PRN) medication orders was not representative of the number of PRN doses actually consumed. The most frequently prescribed PRN medication, propoxyphene compound, accounted for only 0.72% of the total number of doses consumed during the study period.

The second phase of this study investigated the feasibility of employing a capitation fee in lieu of the present professional fee system of reimbursing pharmaceutical providers to Medicaid recipients. All mathematical computations were based upon financial data for the 120 bed study nursing

home and from data available from the Texas State Department of Public Welfare (DPW). Records of sales, cost of goods sold, and profit were easily obtainable for the 120 bed nursing home since one pharmacy provided 99.6% of all medications ordered. Data obtained from DPW reported that the average Medicaid beneficiary received 1.9 - 2.0 reimbursed legend medications per month and that the provider received a mean assigned variable fee (professional fee) of \$2.27 for fiscal year 1976. This data equates to a \$0.15 - \$0.16 per patient per day fee depending upon the amount of assigned variable fee. The study showed that the provision of all legend medication would require a capitation fee of \$0.32 per patient per day. Although variations in sales and profit would occur among pharmacies, the use of a capitation system is probably not economically feasible as long as the state of Texas bases its fees upon data which do not reflect true medication consumption.

The second phase of this study also investigated the feasibility of conversion to unit dose drug distribution. Reductions in medication errors and drug wastage usually are achieved using unit dose drug distribution. The data, based upon the actual number of prescriptions sent to the nursing home, showed that the 120 bed study nursing home population could utilize unit dose medication for a per patient cost of \$1.02 per month not including the cost of the medication. This figure of \$1.02 is based on a maximum of three

prescriptions per patient per month. The cost of medication stored in the administrator's office which was labelled for destruction totalled \$1.80 per month per patient. Recovery of unused medication that is presently destroyed may pay for the conversion to unit dose drug distribution.

A state - wide feasibility study using randomly selected nursing homes would be the most accurate method of testing the validity of this hypothesis. Improving the care received by nursing home residents must first begin with a thorough review of the reasons for the continued classification of these patients as outpatients. Outpatient classification, freedom of choice, and state labelling requirements for unit dose packaging are areas of conflict which must be satisfactorily resolved before the benefits of a unit dose distribution system can be fully realized.

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## GLOSSARY

Bingo Card: Term used to describe a paper board card with holes corresponding to the number of doses. The cards utilize plastic blisters on the front side and aluminum foil for a backing. Doses are removed by pressing the medication through the foil backing.

Capitation Fee: Synonymous with retainer fee.

Category I Patient: For this study, synonymous with a skilled care patient.

Category II Patient: Synonymous with a skilled care patient.

Category III Patient: Synonymous with an Intermediate care III patient.

Intermediate III Nursing Care (ICF III): A level of daily nursing care which requires some assistance with each aspect of physical care such as bathing, feeding, dressing, or ambulation performed or supervised by licensed nursing personnel but not requiring skilled nursing techniques.

Intermediate III Patient (ICF III): A patient who requires some aspect of ICF III nursing care. This type of patient usually requires direct nursing assistance with hygienic

needs.

Legend Medication: Synonymous to prescription medication.

Over-the-Counter Medication: Drugs which are either distributed as trademarked items through professional outlets or distributed as household remedies through retail non-professional stores.

Prescription Medication: For this study defined as any medication bearing "Caution: Federal law prohibits dispensing without a prescription."

Private-Pay Patient: For this study, a nursing home resident whose care is paid for by personal financial resources or by means other than by welfare, Medicare, or the Veterans Administration.

Pro re nata (PRN) medication: Legend or over-the-counter medication which is ordered and consumed on an "as needed" basis.

Professional Fee for Service: A method of provider reimbursement which accounts for all dispensing costs independent of ingredient costs. In the state of Texas, providers receive a set dispensing fee for each legend medication

dispensed to a Medicaid recipient up to a maximum of three state reimburseable prescriptions monthly.

**Retainer Fee:** A method of provider reimbursement which utilizes a monthly fee for the provision of all legend medications. The fee is a charge for service with all medications being provided at cost.

**Self-Medication (Self-Med) Patient:** An individual who requires minimal nursing care and who takes and safeguards his own prescribed medications.

**Skilled Nursing Care:** A level of complete daily nursing assisted care which provides every aspect of physical care such as bathing, feeding, dressing and ambulation performed or supervised by licensed nursing personnel.

**Skilled Patient:** A patient who exhibits extreme physical or emotional problems, may be unable to verbally communicate his needs, and requires skilled nursing care.

**Vendor Stock:** Non-legend medications that are ordered in bulk supply from a pharmacy and provided to Medicaid patients as part of the service under Article 695, j-a, Vernon's Texas Civil Statutes.

**Veterans Administration (VA) Contract Patient:** A patient who



resides in a private nursing home by virtue of an agreement entered into by the nursing home and the VA. The terms of the contract usually stipulate that the home will provide all medical care, nursing care, and over-the-counter medication.

## CHAPTER I

### INTRODUCTION AND LITERATURE SURVEY

#### INTRODUCTION

The Texas State Department of Public Welfare (DPW) is charged with administering the Medicaid program which currently provides medically and/or categorically indigent recipients with certain types of medical care. Upon proof of eligibility, Medicaid beneficiaries idealistically receive the same quality medical care as private pay individuals. Among the benefits provided the Medicaid recipient is the right to pharmaceutical services and the freedom of choice of the provider of these services.

Pharmacists who dispense prescriptions to welfare patients are reimbursed under the provisions of the Texas Vendor Program at the maximum rate of \$2.75 per prescription up to a limit of three prescriptions per patient per month. Under the present method of reimbursement, the providers are constantly faced with the choice of: (1) providing a questionably effective medication and collecting the dispensing fee, or (2) recommending discontinuance of the medication and forfeiting the dispensing fee. If the provider is not retained as the consultant for the nursing facility, intraprofessional conflict can arise over discontinued medication and the subsequent loss of revenue. Although the care of the patient should be the prime concern,

pharmacists cannot continue to provide services which result in a loss of revenue.

Currently most providers utilize the "individual prescription" system for drug distribution to institutionalized Medicaid recipients. Each medication container is stored in individual patient bins at the nursing home, and the medication is distributed to the patients using methods similar to those used in hospitals. In a nursing home facility, the major deficiency with the individual prescription system is waste. The turnover of patients due to relocation or death, and the readjustment of therapy required with old age maladies generate an enormous quantity of medication which, by law, cannot be returned to stock and thus must be destroyed.

Among the several recognized methods of pharmaceutical reimbursement, the "professional fee plus cost" system is more widely utilized and is the system in current use in the state of Texas. In addition to drug wastage, this system generates an excessive amount of bad debts and personnel costs, both of which must be absorbed by the pharmacist. This method of reimbursement is too closely tied to a drug product and has precipitated charges that the profession of pharmacy was being forced to subsidize the welfare program. Under this system, the continued health of a medically and categorically indigent patient is tied to a medication limit which can be exceeded only if a benefactor provides the

additional funds.

This study will examine an alternative method of reimbursement which will dissociate the professional fee for service from the drug component and provide all legend medication to the institutionalized Medicaid recipient (i.e., eligible nursing home resident). This study will also examine an alternative method of drug distribution which may reduce medication errors and allow for the recovery of unused medications currently being destroyed.

This study is intended to be a pilot study on prescribing habits, drug costs and waste under the present reimbursement and drug distribution systems which might serve as the basis for a larger, preferably state-wide feasibility study. This study should be implemented and evaluated by the Texas State Department of Public Welfare.

## HISTORY AND LITERATURE SURVEY

The Social Security Amendments of 1965 (Public Law 89-97) established Title XIX (more commonly known as Medicaid) for the express purpose of enabling the Federal government to share, with participating states, the cost of providing medical care to the categorically and medically needy (1). Participation by the Federal government is based upon variable matching fund formulas with the assistance level to the individual states varying from 50 percent to 80 percent (2).

A series of Senate investigations on alleged kickbacks to nursing homes and overpayments to providers focused immediate attention upon the shortcomings of the Medicaid program. Professional pharmaceutical organizations repeatedly attacked the legislation for its lack of interstate standardization and lack of adequate reimbursement to vendors. The inability of many states to accurately project program costs led to numerous reductions in benefits which, subsequently, required pharmacists to defend their rights to sufficient reimbursement for total services rendered. Currently the greatest challenges to the profession of pharmacy are: (1) to determine to what extent professional services can be offered with the present levels and methods of reimbursement, and (2) to influence third-party payors to recognize alternative drug distribution and reimbursement methods for the betterment of patient care.

## The Medicaid Program

The Social Security Act (SSA) of 1935 established various individual categories of need and allowed certain costs of medical care to be used in the computation of a monthly assistance payment. This legislation was amended in 1950 to provide direct reimbursement to providers of welfare recipients and to establish what is now known as a vendor payment system.

Although the Social Security Act (as amended), recognized the financial burden that large medical expenses imposed on the categorically needy, it provided no cash assistance to those aged individuals above the minimum income level who acquired extraordinary medical liabilities. The Kerr-Mills Bill of 1960, established a medically-needy category for aged persons not on welfare and provided funding through Federal reimbursement. This legislation served as the foundation for the two present medical assistance programs; namely, Medicare and Medicaid.

Medicare provided medical insurance for the aged and was financed by employer-employee contributions with an optional monthly premium paid by the enrollee and matched by the Federal government. Medicaid which became effective 1 July 1966, complemented Medicare by paying all or part of any deductibles or co-insurance, and paid the monthly premium of the optional medical insurance, within certain limitations (1). Public Law 90-248 of 1967, amended the Title XIX

program by establishing a maximum income level for federal funding of medical assistance to the "medically" needy. These amendments also authorized experimental reimbursement projects, subject to approval by the Secretary of Health, Education and Welfare. As of 1 July 1969, participating states were required to allow Medicaid beneficiaries freedom of choice among medical facilities and providers of professional services. Congress also granted states the right to reduce the amount and scope of benefits offered as long as seven basic services were provided to welfare recipients (3). These services included:

1. Early and periodic screening, diagnosis and treatment services for children under twenty-one,
2. Home health services to anyone entitled to nursing home services,
3. Inpatient hospital services,
4. Laboratory and X-Ray services,
5. Outpatient hospital services,
6. Physician's services and
7. Skilled nursing home services.

In October 1972, House Rule - 1 (H.R. - 1; P.L. 92-603) was enacted. It authorized individual states the decision making power concerning welfare programs. This legislation authorized aid to all Supplementary Security Income (SSI) recipients and allowed the use of "spend-down" to prevent states

from ignoring the size of an applicant's medical expenses when determining eligibility. H.R. - 1 also required that utilization review procedures be developed to monitor quality of care.

The determination of eligibility under Medicaid is set by the individual states. Initially, Medicaid could be received by:

1. Individuals qualifying for Old Age Assistance,
2. Individuals receiving aid from Federal-State public assistance programs such as Aid for Families with Dependent Children (AFDC) and
3. Individuals under the age of twenty-one as a result of not qualifying for AFDC because of certain state imposed restrictions.

Several additional groups have since been added as has the requirement for eligibility review at least every twelve months.

In 1967, the Texas Medical Assistance Act was signed into law. This legislation created the Nursing Home Vendor Program and authorized the Texas Department of Public Welfare to administer it (Article 695, j - 1, Vernon's Texas Civil Statutes, as amended). (4)

On 1 September 1971, prescription medication was authorized under the Texas Vendor Program, since it was thought that providing physicians' services and not medication, was not preventive medicine (5). Although the Texas Medicaid



program was recommended to the U.S. Department of Health, Education and Welfare (HEW) as a national model, on several occasions attempts have been made to reduce benefits to stay within the program's allocated budget. In 1970, the Public Welfare Commission ordered a twenty percent reduction in benefits as a result of an anticipated \$42 million deficit. This reduction in benefits was averted by an allocation of \$13.5 million by the Texas legislature (2).

On 19 December 1976, the State Board of Public Welfare announced intentions to name a "blue ribbon" commission to study and recommend services which could be eliminated (6).

The cost for providing welfare recipients with the same quality care as private pay individuals has been the major problem of all state Medicaid programs. In 1960, the average cost for a Medi-Cal recipient was \$517 compared to \$552 for an average American family of four (2). In 1971, the state of California implemented a requirement of prior authorization for outpatient service visits and for prescription medications exceeding two per month. For those individuals with income or personal property, a co-payment was imposed for the first two outpatient visits and for the first two prescriptions per month (7). In Texas, between 1966 and 1974, the biennial appropriations for the Medical Assistance Program rose from \$25.6 million to \$448 million. The projected cost for fiscal 1979 is \$973 million. For fiscal 1977, Texas will be reimbursed by the Federal government, at a 60.66

percentage level instead of the current 63.59 percentage level. This reduction results from the increasing per capita income in the state of Texas (6).

The Federal government has also had to increase its yearly Medicaid appropriation. From fiscal 1966 to fiscal 1970, the cost of the program increased from \$200 million to \$2.6 billion. Approximately 40 percent of these funds went for services to people over age 65; 30 percent for nursing home services; and 20 percent for drugs, laboratory and other services (3).

#### The Nursing Home Industry

According to Manard et al. (8), the original skilled nursing facility was a place where a lower level of care was given at lower costs for long-term or terminal patients. To a great extent, this definition is still valid. Prior to 1965, nursing homes were mainly supported by philanthropic donations (9). By 1973, however, 66 percent of all nursing home revenues came from public funds, such as Medicaid and Medicare, rather than from private donations (11). Federal expenditures for nursing home care amounted to 21 percent of the total Medicaid dollar and 2 percent of the Medicare dollar. In 1975, of the \$41 billion spent by the Federal government for health care, \$10.6 billion was spent on drugs (12).

The advent of Medicare, Federal reimbursement to state Medicaid programs, and the increasing geriatric population, have all been contributing factors to the development of the

nursing home industry. Between 1960 and 1970, the over 65 population increased 21 percent compared to an increase in the general population of 13 percent. As of 1974, there were 16,000 nursing homes providing care and shelter to 1.1 million residents of the United States. Based upon the total geriatric population (65 years or older), however, only 5 percent of the elderly actually reside in a nursing home facility. (10) Although the term "nursing home" has been stereotyped into meaning a depository for the unwanted, senile or chronically ill elderly, many patients are less than 65 years old and are placed into these facilities to recover from debilitating diseases since nursing home care is less expensive than hospitalization. Unfortunately, many of these individuals probably received the type of nursing home care reported during Senate investigative hearings on the aged (11). Abuses commonly discovered in the nursing homes were:

1. Negligence leading to death or injury,
2. Unsanitary conditions;
3. Poor food,
4. Inadequate control and overuse of certain medications and
5. Misappropriation and theft.

The attainment of satisfactory housing on fixed incomes and the increasing cost of health care (the 1975 average was \$1360/year/person) have been major problems for the aged. In 1970, the elderly male earned approximately \$3000 less per

year than the mean annual income for all males (8). On 1 January 1974, the Federally funded Supplementary Security Income (SSI) was implemented to provide qualified individuals with a monthly cash assistance. The intent of this legislation was to provide benefits which could be received even if the individual qualified for other benefit programs such as food stamps or surplus commodities. For the institutionalized elderly, any increase in real income afforded them by various subsistence programs, however, has probably been negated by increases in nursing home charges (currently estimated at \$600 per month) and medication costs.

In fiscal 1975, the average drug bill for the over 65 age group was \$117.68 compared to \$48.93 for all other age groups (13). For the institutionalized aged, the mean cost of drugs has been estimated at \$300 per year which in 1972 accounted for 10 percent of all nursing home expenditures (11).

The average nursing home resident has been estimated to consume 4.2 to 16.0 different medications each day (14,15). Several studies have shown a direct relationship between the number of drugs consumed at a given time and the frequency of drug reactions (15-17). Hurwitz, in 1969, noted a significant increase in morbidity due to adverse drug reactions in hospitalized patients 60 years of age or older (19). A recent study (20), conducted during a 21 month period, showed that adverse drug reactions occurred in 28 percent of heavy drug users (8 or more drugs in a three month period)

versus 8 percent in light drug users. The study also showed that heavy drug users were more likely to be older, female and white. It has been suggested that the heavier use of medication by elderly females resulted from more frequent physician visits and a general tendency for females to take better care of themselves (21). Treatment with polypharmacy was recently shown to be related to patient age and to a lesser extent to sex (22).

According to Kane (23), many nursing home residents are over-medicated, especially with psychoactive drugs, or are administered multiple medication with antagonistic actions. The prescribing patterns of physicians and the administration of medication to the elderly have been under recent intensive study. Hopkins et al. (7), reported that 14 percent of a study population in an intermediate care facility were receiving cardiac medication without any diagnosis of heart disease in the medical record. In a study conducted by Cobb et al. (24), five of the ten leading drugs prescribed under the Mississippi Medicaid program were specified as "not recommended" or as "irrational mixtures" by the American Medical Association. In 1966, the Task Force on Prescription Drugs (25), reported that the elderly viewed arthritis, hearing loss heart problems, and high blood pressure as their most common medical conditions. Physicians' prescribing patterns, however, indicated that heart conditions, high blood pressure, arthritis, and mental and nervous conditions were

the most prevalent disease states and that heart drugs, tranquilizers, diuretics, and sedatives were the most commonly prescribed therapeutic classes of drugs.

In the general population the use of drugs that affect the central nervous system has been analyzed in several studies (26-29). Shaw (26), in a study of 127 elderly patients, noted that psychotropic drugs and cardiovascular medication were most often prescribed. In testimony before the Senate Subcommittee on Long-Term Care (14) Sen. Charles Percy noted that, under the Illinois Public Assistance program, larger reimbursements to nursing homes were given for patients considered as "behavior problems" who required daily doses of injectable tranquilizers. A General Accounting Office (GAO) audit of the New Jersey, Illinois, and Ohio Medicaid programs showed that Mellaril® and Thorazine® accounted for 10 percent of all drugs purchased (14). The conclusions from the Senate investigations showed that "... the poorly controlled drug distribution system in nursing homes provides an open and tempting opportunity for numerous abuses (14)." Abuses cited in the report included:

1. Use of medications of discharged or deceased patients,
2. Borrowing from one patient's supply to administer to another patient and
3. Theft.

The high incidence of incomplete charting, missed doses, and

administration errors was directly attributed to poor drug control.

The Federal Conditions of Participation for Skilled Nursing Facilities (31) outlined a new role for pharmacists in an attempt to rectify the drug distribution and control problems cited by the Senate investigators. The amount of time a pharmacy consultant spends in a facility is determined by the level of care (i.e., skilled, intermediate) and by the number of beds in the facility. Additional time, above the minimum prescribed by law, is negotiated between the pharmacist and the nursing home. In most states, the consultant pharmacist is responsible for: (1) monitoring charting and drug administration practices, (2) controlling medication within the nursing home, (3) conducting in-service training, and (4) monitoring patient charts for adverse drug reactions. Additional duties such as serving as a member of the Infection Control Committee, Pharmaceutical Services Committee, and the Utilization Review Committee (optional) are outlined in the Federal regulations. Philip (32), has stated that the pharmacist also has a definite role in rational drug prescribing and drug usage. Maximal utilization of the pharmacist is severely hampered as a result of:

1. The current method of drug distribution used by nursing homes and
2. The use of the "professional fee plus cost" method for reimbursement to providers.

## Drug Distribution

The drug distribution system most often used in nursing homes is the individual patient prescription system. Numerous studies have shown that this type of drug distribution system is time consuming, increases the chance for medication errors (33,34), and generates a substantial amount of waste. Mathieson and Rawlings (35), in a medication study of 40 patients, estimated that \$3.55 per patient per month was wasted under a traditional (e.g., individual prescription) drug distribution system because medication had to be discarded.

Several studies (34-37) have been published which describe the implementation of unit dose drug distribution in nursing homes. The unit dose system (38-41) employs sealed packaging and individualized doses in a form ready to administer to the patient. Cost effectiveness claims due to reductions in dispensing time and labor costs, have recently been challenged (42). The ability to recover and re-dispense medication which has been discontinued due to order changes, patient transfer or demise, however, is a non-refutable advantage of unit dose systems. According to Rawlings (32), the expense of establishing a unit dose system may be off-set by recovered discontinued medication. Implementation of the unit dose concept in nursing homes may reduce the need for monitoring medication labelling and storage, and allow sufficient time for the consultant pharmacist to utilize his drug



knowledge to discuss patient therapy with the physicians.

### Reimbursement to Providers

By law, the nursing home resident has free choice among providers of pharmaceutical services. It is, therefore, quite possible that the pharmacy consultant for the facility would not be a provider. In a study of 167 patients in a nursing home, Goldenberg (43) reported 54 different pharmacies supplied medications, and that one nurse spent her whole eight hour shift ordering patients' drugs. He concluded that as a result of the wide variety of providers, the consultant pharmacist was unable to gain any cooperation. Another plausible explanation for the lack of cooperation between providers and consultants is that provider pharmacists are currently faced with an ever-widening gap between those fees received from third party insurers and fees received from private consumers. Under the current method of provider reimbursement, any recommendations for elimination of unnecessary medications by the consultant pharmacist may result in the loss of a number of dispensing fees for the provider.

Historically, the final charge for a prescription has been derived from a combination of commodity cost plus a professional fee for service (44). Under the Medicaid program, individual states determine the professional fee that will be allowed. HEW functions in an advisory capacity and has the power to insist that states conduct surveys to establish appropriate reimbursement levels. According to the National

Association of Retail Druggists (45), HEW also has the authority to withhold Federal monies from those states that do not comply with regulations.

HEW has further complicated the reimbursement problem by developing the Maximum Allowable Cost (MAC) program including the Estimated Acquisition Cost (EAC) provision. MAC establishes the amount of reimbursement for medication based upon the price at which it is most frequently purchased (46). As a result of the proposed implementation of MAC/EAC and the already inadequate professional fees, pharmacists in Texas, Ohio, and New York have either brought suit against MAC implementation or have begun a Medicaid boycott (47). William S. Apple has stated "... if dispensing fees in all states were current and equitable, the Federal government could base reimbursement on actual acquisition cost and scrap the entire EAC nightmare (46). "Ruchlin (48) summarizes the entire reimbursement problem by stating: "... it has been a common belief that the government is more concerned with economics in long-term care than with patient care." The development of MAC was in partial response to excessive costs incurred by the Medicaid program. Smith (49) states that excessive costs arise from:

1. Overuse of drugs and services,
2. Poor prescribing by physicians,
3. Inadequate performance by pharmacists,
4. Inefficient administration, and/or

## 5. Dishonesty throughout the program.

Attempts to contain program costs have already resulted in restricted benefits, co-payments or the implementation of formularies and generic prescribing. California's experiment with co-payments did show a decrease in utilization of prescription services. However, it was postulated that patients postponed seeking medical attention until advancement of the disease forced possible hospitalization (50).

The Medicaid program in the state of Texas restricts reimburseable prescription services to three prescriptions monthly and utilizes the professional fee plus cost system. Under the Texas Medicaid program, the provider must bill the individual patient for any legend medication beyond the three prescription limit. The provider must assume all costs and cash flow problems incurred with any additional patient billing. Hence the professional fee system used to reimburse providers for services rendered is totally dependent upon the provision of a commodity and encourages the substitution of sales volume for patient satisfaction.

### The Retainer System

Wertheimer (51-53) has described a retainer fee system as it applies to the profession of pharmacy. This type of reimbursement system has the following advantages:

1. Potentially reducing the total number of prescriptions dispensed, since all orders could be examined for over-utilization in an unbiased

manner, and

2. Eliminating additional billing expenses to individual patients, thus de-emphasizing the business aspect of pharmacy.

DeNuzzo (54) has noted that as the number of covered patients increases, a monthly retainer fee may have to be used to simplify billing procedures. According to Fink (55), under a retainer<sup>1</sup> fee, stress is placed upon payment for professional service. The commodity is provided to the patient at cost.

As cited in the literature, the major disadvantages of a retainer system are that the freedom of choice of vendor may be restricted, and the system may stimulate over-utilization of medication, since all medications are provided. Smith (49) and the Texas Pharmaceutical Association (56), both claim that a retainer system would violate the freedom of choice of provider. Contradicting this argument, Provost (57) has stated that patronizing a single pharmacy would "... foster the personal pharmacist concept..." and permit the development of patient medication profiles.

The fear of ever increasing costs due to third party beneficiaries' desires to be medicated, has contributed to reductions in benefits (58). Recent controlled studies have shown, however, that increased costs of third party medical insurance programs may not be related to over-prescribing or over-utilization of medication. Nithman et al. (59) studied drug utilization in conjunction with the Medicare program and

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<sup>1</sup>Author uses the term "capitation" in place of "retainer".

found that no significant differences existed in drug utilization before and after the inception of the program. Lech et al. (20), in a study of heavy drug users, found that drug use was associated with a greater use of other types of medical care but was not affected by whether or not a third party was the payor. Weeks (60) found that the total cost of drugs prescribed to eligible persons did increase under a pre-paid drug insurance program, but that this may have been due to either higher prices per prescription or increased prescribing of more expensive drugs. Rabin (61), in a study which analyzed the use of physicians' services by Medicaid recipients, noted that Medicaid beneficiaries were the highest consumers of prescription medication, although, admittedly, they were also the most likely to be chronically ill.

## CHAPTER II

### PROBLEM STATEMENT

The present study will determine the feasibility of utilizing a capitation system in lieu of the present professional fee method of reimbursing provider pharmacists. The study will also investigate the feasibility of converting to unit dose drug distribution in nursing homes. Variables which will be investigated include patients' medication usage, drug wastage, physicians' prescribing habits and additional expenses incurred under the presently used systems. Implementation of an alternative reimbursement system and drug distribution system should improve patient care and provide a better financial return for the providers of pharmaceutical services to Medicaid patients.

## CHAPTER III

## METHODOLOGY

The sites chosen for the retrospective prescribing and drug review portion of this study were three nursing home facilities hereafter referred to as Homes X, Y, and Z. Home X is a Federal nursing home, whereas Homes Y and Z are private and corporate facilities, respectively, and for the purposes of this study are considered community nursing homes.

HOME X

This nursing home is located within a large, Federal, general hospital. The patient population of this 78-bed unit is divided into various categories according to the amount of required daily nursing care. For this study, all Category I and Category II patients were classified as requiring skilled nursing care. Categories III and IV patients were defined for purposes of this study as requiring Intermediate III type care. Pre-discharge patients, as a rule, were re-classified to a self-medication (Self-Med)category by the nursing staff of Home X to evaluate the rehabilitative potential of the patient. Patients of Home X do not incur any personal cost for medical care administered. Physician services are provided by a full-time physician who, as the designated Chief of Extended Care Services, is authorized prescribing privileges for all medication, formulary or non-formulary. As a member of the hospital staff, the physician for Home X may request

medical consultations from any specialty service within the hospital and may order any laboratory procedure. These professional services are provided free of charge to the patients. Pharmaceutical services are provided via a ward stock system for all patients except those designated as Self-Med. These individuals obtain a one - month supply of medication through the outpatient pharmacy department and are responsible for taking and safeguarding their own medications. The only exceptions to the Self-Med program are sedative-hypnotic and anticoagulant medications.

#### HOME Y

This 120 bed, privately-owned nursing home provides professional care to private pay individuals and Medicaid recipients. The DPW provides the nursing home with a Maximum Recognized Monthly Rate for each Medicaid recipient. The nursing home must have a total care plan for each patient, provide nursing care, and provide all over-the-counter medication. Upon admission to the nursing home each Medicaid patient's total medical care plan is prepared on a special form and forwarded to the local Medical Assistance Unit (MAU). The MAU is responsible for determining the amount of state support based upon the level of care. The Medicaid recipient is allocated thirty-two dollars monthly for personal items. The Medicaid beneficiary may elect to continue using the services of a family physician or may choose to become a patient of a physician who is retained by other residents within the



nursing home. The physician is reimbursed, by the state of Texas, for only one visit per month per patient unless a documented emergency arises.

Physician services for private pay individuals are provided by family physicians who see their patients as often as required, subject to the financial limitations of the patient or his family. Residents of Home Y who require supportive medical data such as electrocardiograms or laboratory analyses must utilize the services of a commercial laboratory.

Medicaid recipients, by law, have complete freedom of choice as to the provider of legend pharmaceuticals. All over-the-counter (OTC) medications, which are ordered by a physician, are provided by the nursing home using their vendor stock. In the state of Texas, because of the three prescription reimbursement limitation on legend pharmaceuticals, additional legend medication required by the patient must be procured with personal funds. All pharmaceutical needs for the private pay individual are provided through the patient's pharmacy of choice.

#### HOME Z

This 160 bed, corporate nursing home provides professional care to Medicaid recipients, private pay individuals, and Veterans Administration (VA) contract patients. The majority of the Medicaid recipients in this facility would be classified as requiring skilled nursing care. Professional services for the Medicaid and private pay populations of this facility

are provided in the same manner as Home Y.

The VA contract patient receives all medical care free from personal cost. The nursing home provides all nursing care and over-the-counter medications for a daily fee stipulated in the contract. Legend medication is provided by the pharmacy department of a Veterans Administration hospital or clinic. All professional medical services are paid for by the nursing home and are provided by civilian physicians and commercial laboratories.

#### Data Collection Procedure

All data pertaining to the prescribing and drug review portion of this study were collected from patient medical records. The medical records review was conducted on all patients who resided in one of the three nursing homes during the period January 1, 1976 to March 31, 1976. In each home utilized in this study, three separate filing systems are used to store patient records. Current patient records are kept in metal charts on the nursing unit and contain admission histories, daily progress notes, medication administration records, and other required forms used to monitor the daily progress of the patients. At the end of three months, the charts are reviewed and material not essential to the daily care of the patients is removed and temporarily stored in the patients' overflow files. Upon discharge from the home, the entire patient record is placed into the discharge file. A new file folder is created for each subsequent

readmission and discharge. Each of these files were used in compiling the data for this study. The data recorded for each patient are shown in Table 1. The medication data, as shown in Table 2, were collected for each medication prescribed for the study patients or on which the patients were maintained during the period of investigation. The names of prescribed medications were recorded and analyzed as ordered by the study physicians. A list of manufacturers is provided in the appendix for those drugs prescribed by a trademarked name.

The data obtained were coded on an 80 column keypunch form, and to facilitate coding, data listings were made for many of the variables. Ascending numeric characters were assigned to each component within the variable. For example, the variable name "Principal Physician" had a listing of 94 individuals. Each physician was assigned, therefore, a number ranging from 1 to 94.

Much of the data for this study were collected from standardized forms within the medical record. The form shown in Figure 1 provided a listing of current medications, level of nursing care required by the patient, and a patient medication administration record for each individual in Home Y and Z. The form shown in Figure 2 provided a listing of current medications and a patient medication administration record for individuals in Home X.

For each patient in Homes Y and Z, an updated medical

TABLE 1

DATA COLLECTED FOR EACH PATIENT RESIDING IN  
STUDY NURSING HOMES DURING 1 JANUARY 1976 TO 31 MARCH 1976

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Patient's name

Nursing home

Admission date

Total number of days in the facility during the study

Reason for discharge

Principal physician

Age (in years)

Sex

Category of care

Major payor for care

Major medical problems (three most significant)

Medication data

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TABLE 2

DATA COLLECTED FOR EACH MEDICATION PRESCRIBED FOR  
PATIENTS IN THE STUDY NURSING HOMES

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Date ordered
Name of drug
Dose
Source of drug (prescription or over-the-counter)
Directions
Route of administration
Number of doses taken during the study
Ordering physician
Provider of medication
Community pharmacy utilized
Discontinue date
Type of administration error
Total number of doses administered in error
Reason for the drug
Were laboratory tests ordered
If laboratory tests were ordered, were they the most significant tests
Were there any potential incompatibilities or therapeutic contraindications
Total number of doses administered that were incompatible or contraindicated
Number of refill requests

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## MEDICATION CHART RECORD

[illegible]

Figure 1

A Reduced Copy of the Medication

Administration Record Used in Homes Y and Z.

YEAR:		MONTH(S):	
DATE	MEDICATION AND TREATMENT <small>(A nurse will initial each entry to verify that it has been correctly transcribed. SEE REVERSE SIDE FOR IDENTIFICATION OF INITIALS.)</small>	T O U R	DATE
			NURSES' INITIALS
		N	
		D	
		E	
		N	
		D	
		E	
		N	
		D	
		E	
		N	
		D	
		E	
		N	
		D	
		E	
		N	
		D	
		E	
		N	
		D	
		E	

Enter in space below: PATIENT IDENTIFICATION - TREATING FACILITY - WARD NO. - DATE

MEDICAL RECORD

CONTINUING MEDICATION  
AND TREATMENT

Figure 2

A Reduced Copy of the Medication  
Administration Record Used in Home X.

problem listing was maintained in the medical record by a qualified medical records technician. Medical problems as determined by the physician conducting the admission history were listed. In a similar manner, a problem list was maintained for each patient in Home X except that a nurse practitioner was responsible for any updating. For the purpose of this study, the assumption was made that the medical problems, which appeared on the patients' problem listings, were in order of prominence. The first three problems listed were considered as the primary, secondary, and tertiary medical problems exhibited by the patients.

A judgement was made by the investigator as to whether or not a drug was indicated for a problem presented by the patient. For each drug a subjective evaluation was made utilizing the following criteria:

1. The drug was indicated if its use could be associated with a problem mentioned in the admission history, nurses' or doctors' progress notes, or discharge summary,
2. The drug was indicated if a reasonable association existed between a medication and the requirement for a special diet or a medical device such as a naso-gastric tube,
3. The drug was indicated if within the medical record inferences were made to a previous diagnosis not appearing in the current chart, or



4. The drug was indicated if its use could be associated with a problem and no duplication with other pharmacologically similar agents existed.

Upon determining that duplication of therapeutic agents did exist, the investigator made a judgement as to the drug of choice and coded all other similar agents as duplication orders.

The requirements for supportive laboratory data were based upon the following criteria:

1. The medication order must have been originally written within the study period;
2. If hematinics were prescribed, minimum laboratory data required were a measurement of hemoglobin concentration and red blood cell count;
3. If antibiotics were prescribed, minimum laboratory data required were cultures;
4. If potassium supplements were prescribed, minimum laboratory data required were blood electrolyte values, and/or
5. If anticoagulants were prescribed, minimum laboratory data required were a prothrombin time (PT) for sodium warfarin and a partial thromboplastin time (PTT) for sodium heparin.

For each medication order, a judgement was made as to the most likely provider. For the legend medications

prescribed a Medicaid recipient, there were two possible sources. The investigator coded the three most expensive legend medications as being paid for by Medicaid. Any additional legend drugs received by the patient were coded as being paid for by the patient.

The total number of doses of any particular medication was obtained by examining the patient's medication administration record (MAR, Figure 1 or Figure 2). Every dose of medication that is administered to a patient must be recorded on the MAR by initialing the appropriate day-time block. PRN medication is recorded in the same manner except that in Homes Y and Z the amount and reason for PRN medication must also be placed in the nurses' progress notes.

For this study, the amount of medication administered to a patient must have corresponded to the doctor's order to include time of administration, dose, and duration. Any doses administered that did not meet these criteria were considered to be administered in error. Doses that were not recorded on the MAR were regarded as "doses uncharted", even if after examining the patient record a plausible reason existed for the omission. For each drug item the type of administration error, if any, and the total number of doses in error were coded on the data collection sheet.

Upon completing the medication profile for each patient meeting the criteria of the study, an examination was made for any potential chemical or therapeutic incompatibilities between the various medications received by the patient. If any potential incompatibility were detected, the total number of

doses administered that were potentially incompatible were recorded on the data collection sheet.

The data collected were coded on keypunch cards and analyzed by a Univac® 1108<sup>1</sup> computer utilizing the Statistical Program for the Social Sciences (SPSS)<sup>2</sup> software package. The output received from the data run was a listing of variables by frequency and percentage. A Mathematic 889<sup>3</sup> calculator was used to compute some of the means and the mean number of doses per patient day. The Monroe® 1665 Program Calculator<sup>4</sup> was used to compute values for the Student's t - test.<sup>5</sup>

#### Unit Dose Distribution

The accurate determination of the feasibility of unit dose distribution not only required data on the number of prescriptions dispensed to the nursing homes but also an estimation of drug wastage under the present traditional method of drug distribution. The majority of patient prescriptions sent to nursing homes are in 30-day quantities. Occasionally, however, larger quantities are requested by patients to take advantage of decreased per unit cost. Drug wastage occurs when

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<sup>1</sup>Sperry Rand Corporation, New York, New York

<sup>2</sup>Chi Corporation, Cleveland, Ohio

<sup>3</sup>American Circuitron, Inc., Hamden, Conn.

<sup>4</sup>Monroe, The Calculator Company, Orange, New Jersey

<sup>5</sup>Statistical Reasoning in Psychology and Education, John Wiley & Sons, Inc., New York, N.Y.

medications are discontinued prior to complete utilization of the supply.

All unused medication stored in the administrators' offices at Homes Y and Z were inventoried. The data recorded for each of the unused medications are shown in Table 3. The data were organized as to whether or not it was a legend pharmaceutical or an over-the-counter medication. For this study, only legend pharmaceuticals were considered as being returnable. Cost data on each medication were obtained from the American Druggist Blue Book.<sup>1</sup> The data were totalled and a mean cost per day of unused medications was computed for each nursing home. The costs associated with the dispensing of "bingo" card unit dose packaging were obtained from a pharmacy provider and compared, on a daily average (mean), to the cost of unused medication.

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<sup>1</sup>Hearst Corporation, New York, N.Y. (1976)

TABLE 3

DATA COLLECTED ON EACH UNUSED MEDICATION STORED  
IN THE ADMINISTRATORS' OFFICES OF HOMES Y AND Z

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Patient's name

Prescription number

Provider pharmacy

Original quantity ordered

Date of order

Quantity remaining in container

---

### Capitation Fee

Data on the total sales, cost of goods sold, and profit for the study period were obtained from a provider pharmacy. Total sales for the study period minus the cost of goods sold yielded the required capitation fee. This figure was compared to the daily fee reported by DPW. Data on cost of goods sold based upon the total number of prescriptions sent to the nursing homes were also compared with the data from DPW.

Since a capitation system provides all legend medication, the requirement for additional patient billing is eliminated. Data on specific statement costs were obtained from a provider pharmacy and the amount per each additional statement, that would be eliminated utilizing the capitation system, was calculated.

## CHAPTER IV

## RESULTS AND DISCUSSION

Prescribing and Drug Utilization Results

A total of 382 patient records were reviewed and utilized for this three month study of prescribing and utilization patterns in three long-term care facilities. Table 4 represents the distribution by frequency and percentage of patients by category of care. For this study, patient categories of care and levels of care were synonymous and were determined by the admitting physician and nursing home personnel. The level of care reflected nursing care requirements only and may not have been the level of care the state of Texas recognized for reimbursement purposes for its Medicaid recipients. The state of Texas only pays for that level of care determined by the Medical Assistance Unit (MAU). The state of Texas reimbursed level of care for each Medicaid recipient was determined from data submitted by the nursing home to the MAU.

Table 5 represents the frequency of patients for each of the major payors of care received by the study patients. The majority of patients were Medicaid recipients requiring either skilled or ICF III type nursing care (Table 4 and 5). Those patients whose monthly income was above the minimum level set by the state of Texas were required to pay for their own care regardless of whether or not they required skilled or ICF III type nursing care. For this study, 59 individuals were listed

TABLE 4

DISTRIBUTION BY FREQUENCY AND PERCENTAGE OF PATIENTS  
BY CATEGORY OF CARE FOR STUDY NURSING HOMES

Category of Care	Nursing Home						Total	
	X		Y		Z			
	Number	%	Number	%	Number	%	Number	%
Skilled	49	69	9	14	88	51	156	45
ICF III	9	13	64	47	76	44	149	34
Private	0	0	51	37	4	2	55	13
Self-Medication Federal	13	18	0	0	0	0	13	6
VA Contract Nursing Home	0	0	3	2	6	3	9	2
Total	71	100	137	100	174	100	382	100



TABLE 5

## FREQUENCY OF STUDY PATIENTS BY MAJOR PAYOR FOR CARE

Major Payor for Care	Nursing Home			Total
	X	Y	Z	
Medicare	0	4	0	4
Medicaid	0	79	160	239
Patient	0	51	8	59
Federal	71	0	0	71
VA Contract (Nursing Home)	0	3	6	9
Total	71	137	174	382

under the patient - pay category.

Table 6 depicts the percentage of patients by sex in the study nursing homes. The Federal facility was 95.7% male, whereas the community nursing facilities were predominately female. Patient ages within the study nursing homes showed considerable variation.

Patients ranged in age from 26 to 101 years in Home X, 58 to 101 years in Home Y, and 27 to 88 years in Home Z. The mean age of the study nursing home populations ranged from 67.2 to 80.4 years (Table 7). The data suggests that as the male patient population in each nursing home increased, the mean age of the patient populations for each home decreased and the standard deviations for each mean age increased.

Table 8 represents the monthly distribution of admissions for the patient populations in this study. This table emphasizes the month of admission for each patient and does not necessarily represent any particular admission year. Assuming that these nursing facilities were at 100% occupancy at all times and that patients were admitted from waiting lists, the admission rates would be directly related to the frequency of discharges from these facilities. The data show that the months of January and February had the largest turnover of patients. The lack of admissions for the month of April at Home Y cannot be explained but may have been influenced by the large January and February admission rates. The increased incidences of influenza and pneumonia in the aged

TABLE 6

SEX OF PATIENTS BY PERCENTAGE IN STUDY NURSING HOMES

Nursing Home	Percentage of Patients	
	Male	Female
X	95.7	4.3
Y	13.9	86.1
Z	31.6	68.4

TABLE 7

MEAN AGE IN YEARS OF PATIENTS IN STUDY NURSING HOMES

Nursing Home	Age	Standard Deviation
X	67.2	$\pm 14.3$
Y	80.4	$\pm 7.82$
Z	73.3	$\pm 13.1$

TABLE 8

MONTHLY DISTRIBUTION OF ADMISSIONS FOR  
PATIENTS IN STUDY NURSING HOMES

Month of Admission	Number of Patients Admitted			
	Home X	Home Y	Home Z	Total
January	6	18	24	48
February	9	16	32	57
March	10	6	24	40
April	3	0	3	6
May	7	17	2	26
June	5	9	9	23
July	5	18	12	35
August	5	15	8	28
September	2	14	8	34
October	3	8	19	30
November	7	6	19	22
December	9	10	14	33

cannot be discounted as a major reason for the January and February admission rates.

Table 9 summarizes the frequency and percentage of medical problems exhibited by the study patients. The major geriatric problem seen in this study was arteriosclerosis which occurred nearly twice as frequently as cerebrovascular accident, the second major medical problem. The diversity of problems seen in the study patients would require that any pharmacist who wished to provide consultant services to a nursing home have a strong background in medical therapeutics.

Table 10 shows the medical disorders exhibited by the patients for each nursing home and grouped according to the major physiological systems affected. Disease processes involving the heart and the brain appear to be responsible for the majority of the problems afflicting the patients in this study. The high incidence of dermatological or skeletal-muscular problems can be related to the large number of patients affected by cerebrovascular or neurological problems (Table 9). The development of decubitis ulcers or muscle contractures can result from the almost total bed confinement seen in patients with cerebral disease.

Table 11 lists the frequencies of medical problems indicated as the primary diagnoses by the physicians for the study patients. Of the 382 patient records reviewed, 71 (18.5%) had cerebrovascular accident or organic brain syndrome as a primary diagnosis. The 51 (13.3%) patients who were diagnosed as having

TABLE 9

LISTING BY FREQUENCY AND PERCENTAGE OF THE MEDICAL  
PROBLEMS EXHIBITED BY THE 382 STUDY PATIENTS

Medical Problem*	Frequency	Relative Frequency (percent)
Arteriosclerosis	123	32.1
Cerebrovascular accident	71	18.5
Organic brain syndrome	71	18.5
Hypertension	64	16.7
Osteoarthritis	56	14.6
Diabetes	48	12.5
Fracture(s)	44	11.5
Atherosclerosis (ASHD)	36	9.4
Cancer	33	8.6
Congestive heart failure	32	8.3
Hemiplegia	32	8.3
Chronic obstructive pulmo- nary disease	25	6.5
Recurrent urinary tract infections	22	5.7
Senility	21	5.4
Parkinson's disease	20	5.2
Anemia	20	5.2

\*Problems listed only if relative frequency greater than  
five percent of occurrences.

TABLE 10

SUMMARY OF THE MEDICAL DISORDERS BY PERCENTAGE  
EXHIBITED BY THE STUDY PATIENTS

Medical Disorders Exhibited by Study Patients	Percentage of Patients *			
	Home X	Home Y	Home Z	Total
Renal and urinary	2.8	1.1	3.9	7.8
Gastrointestinal and hepatic	1.1	4.0	2.9	8.0
Cardiovascular	7.8	33.0	26.1	66.9
Respiratory	0.9	2.7	7.8	11.4
Endocrine	2.0	5.1	6.0	13.1
Hematopoietic	0.5	1.5	4.0	6.0
Cerebrovascular, psychiatric, neuro- logical	14.3	21.4	33.1	68.8
Cancer	2.1	3.0	3.8	8.9
Dermatological, skeletal-muscular	12.9	8.4	16.4	37.7
Sensory	2.7	1.0	4.2	7.9

\* Percentages based upon total study population.



TABLE 11

FREQUENCY OF PRIMARY DIAGNOSES AS RECORDED IN  
THE STUDY PATIENTS' MEDICAL RECORDS

Primary Diagnosis*	Frequency of Patients			
	Home X	Home Y	Home Z	Total
Cerebrovascular accident	11	8	20	39
Organic brain syndrome	10	5	17	32
Arteriosclerosis	6	29	16	51
Osteoarthritis	1	10	13	24
Cancer	5	5	11	21
Hypertension	0	8	11	19
Diabetes	2	7	11	20

\*Diagnosis listed only if total frequency of patients greater than ten.

arteriosclerosis as a primary disease represented the largest single group in this study. The data revealed that hypertension, a common primary diagnosis in the community nursing homes, was not reported for the patients in the Federal facility.

Table 12 lists the frequencies of medical problems indicated as secondary diagnoses by the physicians for the study patients. Of the 382 patient records reviewed, the major medical problems recorded as secondary diagnoses were arteriosclerosis (44 patients, 11.5%) and hypertension (25 patients, 6.5%). Only one patient from Home X was reported to have hypertension as a secondary diagnosis.

Table 13 lists the frequencies of medical problems indicated as tertiary diagnoses by the physicians for the study patients. Of the 382 patient records reviewed, 112(29.3%) patients were diagnosed by their respective physicians as having just a primary and secondary medical problem. Of those patients who were diagnosed as having three major medical problems, arteriosclerosis was the most commonly reported tertiary problem. The data from Tables 11, 12 and 13 reveal that hypertension was not a commonly reported primary, secondary, or tertiary diagnosis for the study patients in Home X.

Table 14 summarizes the most frequently prescribed legend medications for each of the study homes. Of the sixteen most frequently prescribed medications in Home X, three drugs (18.7%) were evaluated by the American Medical Association

TABLE 12

FREQUENCY OF SECONDARY DIAGNOSES AS RECORDED IN  
THE STUDY PATIENTS' MEDICAL RECORDS

Secondary Diagnosis*	Frequency of Patients			
	Home X	Home Y	Home Z	Total
No problem listed	7	11	14	32
Diabetes	6	2	9	17
Arteriosclerosis	4	19	21	44
Organic brain syndrome	5	4	13	22
Fracture (s)	3	9	7	19
Cerebrovascular accident	4	6	9	19
Hypertension	1	12	12	25

\*Diagnosis listed only if total frequency of patients greater than ten.

TABLE 13

FREQUENCY OF TERTIARY DIAGNOSES AS RECORDED IN  
THE STUDY PATIENTS' MEDICAL RECORDS

Tertiary Diagnosis*	Frequency of Patients			
	Home X	Home Y	Home Z	Total
No Problem listed	20	41	51	112
Hypertension	2	9	9	20
Arteriosclerosis	4	13	11	28
Organic brain syndrome	3	5	9	17
Congestive heart failure	1	6	6	13
Osteoarthritis	2	6	6	14
Diabetes	2	4	5	11

\*Diagnosis listed only if total frequency of patients greater than ten.

TABLE 14

LISTINGS OF MEDICATIONS AND FREQUENCY OF ORDERING FOR THE MOST PRESCRIBED LEGEND MEDICATIONS  
IN EACH OF THE STUDY NURSING HOMES

Home X			Home Y			Home Z		
Rank	Drug	Frequency	Rank	Drug	Frequency	Rank	Drug	Frequency
1.	Tetracycline	23	1.	Digoxin	40	1.	Valium <sup>®</sup>	53
2.	Ampicillin	20	2.	Thorazine <sup>®</sup>	30	2.	Pavabid <sup>®</sup>	35
3.	Digoxin	16	3.	Lomotil <sup>®</sup>	28	3.	Thorazine <sup>®</sup>	33
4.	Dalmane <sup>®</sup>	15*	4.	Pavabid <sup>®</sup>	27*	4.	Darvon Compound <sup>®</sup>	32
	Lasix <sup>®</sup>	15*		Mellaril <sup>®</sup>	27*			
5.	Haldol <sup>®</sup>	13	5.	Dalmane <sup>®</sup>	23	5.	Digoxin	30
6.	Macrochantin <sup>®</sup>	10	6.	Valium <sup>®</sup>	22	6.	Lasix <sup>®</sup>	29
7.	Potassium Chloride Solu- tion	9*	7.	Darvocet - N <sup>®</sup>	21	7.	Mellaril <sup>®</sup>	25
	Phenaphen Plain <sup>®</sup>	9*	8.	Lasix <sup>®</sup>	20*	8.	Lomotil <sup>®</sup>	22
8.	Dilantin <sup>®</sup>	8*		Darvon Compound <sup>®</sup>	20*			
	Esidrix <sup>®</sup>	8*						
9.	Vasodilan <sup>®</sup>	7*	9.	Tigan <sup>®</sup>	15*	9.	Dilantin <sup>®</sup>	17
	Elavil <sup>®</sup>	7*		Hiprex <sup>®</sup>	15*			
	Cleocin <sup>®</sup>	7*						
10.	Cogentin <sup>®</sup>	6*	10.	Aldomet <sup>®</sup>	14*	10.	Donnatal <sup>®</sup>	14*
	Mellaril <sup>®</sup>	6*		Cyanocobalamin	14*		Phenobarbital	14*
				Hydergine <sup>®</sup>	14*		Benadryl <sup>®</sup>	14*
				Chloral Hydrate	14*			
				Placidyl <sup>®</sup>	14*			

\*Indicates an equal number of medication orders.

(AMA) Department of Drugs as either being of questionable value (Vasodilan<sup>®</sup>, Phenaphen Plain<sup>®</sup>), or unnecessary for the length of time usually prescribed in this study (Macro-dantin<sup>®</sup>). Of the seventeen most frequently prescribed medications in Home Y, three drugs (17.6%) were evaluated by the AMA as either being of questionable value (Pavabid<sup>®</sup>), or non-superior to other agents (Darvocet - N<sup>®</sup>, Darvon Compound<sup>®</sup>). The package insert for Hydergine<sup>®</sup> states that no conclusive evidence exists for its usefulness in treating arteriosclerosis or cerebrovascular insufficiency but that "... short-term clinical studies have demonstrated modest improvement in levels of performance of self-care." Of the twelve most frequently prescribed agents in Home Z, three drugs (25%) were evaluated by the AMA as either being of questionable value (Pavabid<sup>®</sup>), non-superior to other agents (Darvocet - N<sup>®</sup>) or inadvisable for routine use (Donnatal<sup>®</sup>).

Table 15 lists the most commonly prescribed medications for the 382 study patients. The data show that milk of magnesia was the most frequently prescribed drug in all three study nursing homes. Of the 24 most prescribed medications in this study, nine medications (37.5%) were available as non-prescription (over-the-counter) items. The data show that the four most frequently prescribed medications were all over-the-counter drugs. Digoxin and Valium<sup>®</sup> were the most frequently prescribed legend medications in this study. Of the 24 most frequently ordered medications, laxatives were

TABLE 15

LISTING OF MEDICATION, FREQUENCY OF ORDERING, PERCENTAGE OF TOTAL MEDICATIONS ORDERED, AND RANKING WITHIN EACH STUDY NURSING HOME FOR THE MOST PRESCRIBED LEGEND AND NON-LEGEND MEDICATIONS

Overall Rank	Drug	Frequency	Relative Frequency (percent)	Ranking		
				Home X	Home Y	Home Z
1.	Milk of Magnesia	194	5.8	1	1	1
2.	Aspirin	129*	3.9	2	6	4
	Hexavitamins	129*	3.9	5	2	2
3.	Dulcolax <sup>®</sup>	87	2.6	3*	19*	15
4.	Digoxin	86	2.6	8	3	8
5.	Valium <sup>®</sup>	79	2.4	17*	11	3
6.	Dalmane <sup>®</sup>	71*	2.1	9*	10	6
	Tylenol <sup>®</sup>	71*	2.1	12*	4	10
7.	Mylanta <sup>®</sup>	66	2.0	3*	29*	24*
8.	Pavabid <sup>®</sup>	65*	2.0	18*	9*	5
	Thorazine <sup>®</sup>	65*	2.0	19*	7	6
9.	Lasix <sup>®</sup>	64	1.9	9*	13*	9
10.	Mellaril <sup>®</sup>	58	1.7	15*	9*	11
11.	Lomotil <sup>®</sup>	53	1.6	18*	8	12
12.	Darvon Compound <sup>®</sup>	52	1.6	**	13*	7
13.	Colace <sup>®</sup>	44	1.3	7	18	17*
14.	Diocetyl Sodium Sulfosuccinate	43	1.3	**	5	20*
15.	Tetracycline	38	1.1	4	19*	27*
16.	Darvocet-N <sup>®</sup>	32	1.0	**	12	18*
17.	Ampicillin	30*	0.9	6	23*	30*
	Ascorbic Acid	30*	0.9	16*	15	20*
18.	Dilantin <sup>®</sup>	29	0.9	13*	27*	13
19.	Dimetapp <sup>®</sup>	28	0.8	9*	28*	19*
20.	Aldomet <sup>®</sup>	27	0.8	16*	17*	21*

\*Indicates an equal number of medication orders.

\*\*No orders written for this drug product.

the most frequently prescribed therapeutic class of drugs with analgesics and drugs affecting the central nervous system the second and third most prescribed.

Table 16 summarizes the distribution of legend and non-legend medication orders by study nursing home. The data show that a greater percentage of the medication orders in Home X were for non-legend drug items. Overall, 63.1% of the medication orders for the study patients were for legend pharmaceuticals.

Table 17 depicts the distribution, frequency, and percentage of legend and non-legend medication orders by drug providers in the study nursing homes. Assuming that Medicaid only paid for a total of three legend medications per month for each of its beneficiaries, any additional legend medication prescribed by a physician would had to have been bought using private funds. The data show a nearly equal distribution of medication orders for Home Z between those bought from private funds, Medicaid reimbursed, and those OTC medications provided through the nursing home vendor stock.

Figure 3 depicts the mean number of medication orders per patient by category of care. For the skilled patients, significant differences ( $p < .01$ ) were shown between the number of medication orders in Home Y versus Home X, and Home Z versus Home X. For those patients in the ICF III care class, a significant difference ( $p < .01$ ) in the number of medication



TABLE 16

DISTRIBUTION OF LEGEND AND NON-LEGEND MEDICATION  
ORDERS BY STUDY NURSING HOME

Home	Legend Medication		Non-Legend Medication	
	Frequency	Percent	Frequency	Percent
X	332	49.8	334	50.2
Y	826	62.9	488	37.1
Z	939	70.0	401	30.0

TABLE 17

DISTRIBUTION, FREQUENCY, AND PERCENTAGE OF LEGEND AND NON-LEGEND  
MEDICATION ORDERS BY DRUG PROVIDERS IN STUDY NURSING HOMES

Home	Private		Medicaid*		Nursing Home		Federal	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
X	0	0.0	0	0.0	0	0.0	668	100.0
Y	701	53.3	229	17.4	386	29.3	0	0.0
Z	490	36.6	421	31.5	402	30.0	25	1.9

\*Assumed that Medicaid billed for only three legend prescriptions monthly and that remainder of legend medications, if prescribed, were paid by the patient.

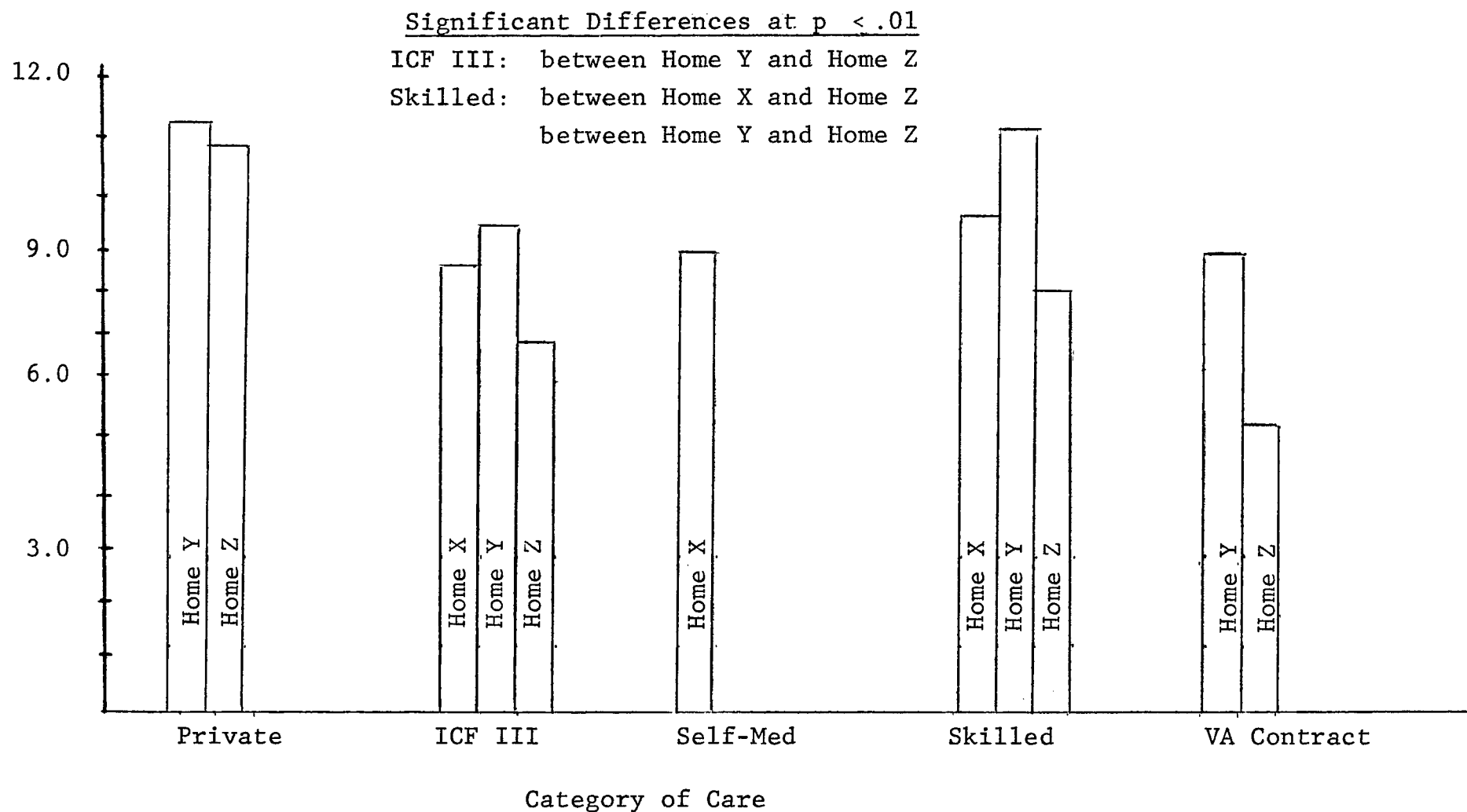


Figure 3

MEAN NUMBER OF MEDICATION ORDERS PER PATIENT BY CATEGORY OF CARE FOR  
THREE MONTH STUDY PERIOD

orders was seen between Home Y and Home Z. All other statistical comparisons of medication orders between categories of patient care for the study nursing homes showed no significant differences at the  $p < .05$  level, although, the mean number of medication orders per patient was consistently greater at Home Y than at the other study homes.

The mean number of doses of medication consumed per patient per day by category of care is depicted in Figure 4. A statistically significant difference ( $p < .01$ ) is seen for the ICF III patient populations of Home Y versus Home Z. All other comparisons of medication consumption between categories of patient care for the study nursing homes were not significant at the  $p < .05$  level. The data suggest that the number of medication orders prescribed is not a true reflection of the number of doses consumed (Figure 3 and 4). The patient population of Home Y consistently had a greater number of prescribed medications per patient. The skilled and private-pay patient populations of Home Z, on the average (mean), consumed more doses of medication. The patient population of Home X consumed an average (mean) of 6.7 doses of medication per patient per day representing a total medication consumption of 44,288 doses for the study period. The patient population of Home Y, on the average (mean), consumed 8.4 doses per patient per day totalling 95,039 doses for the study period. The patient population of Home Z consumed a total of 106,632 doses for the study period averaging (mean)

Mean Number of Doses Consumed per patient per Day

Significant Differences at  $p < .01$   
ICF III: between Home Y and Home Z

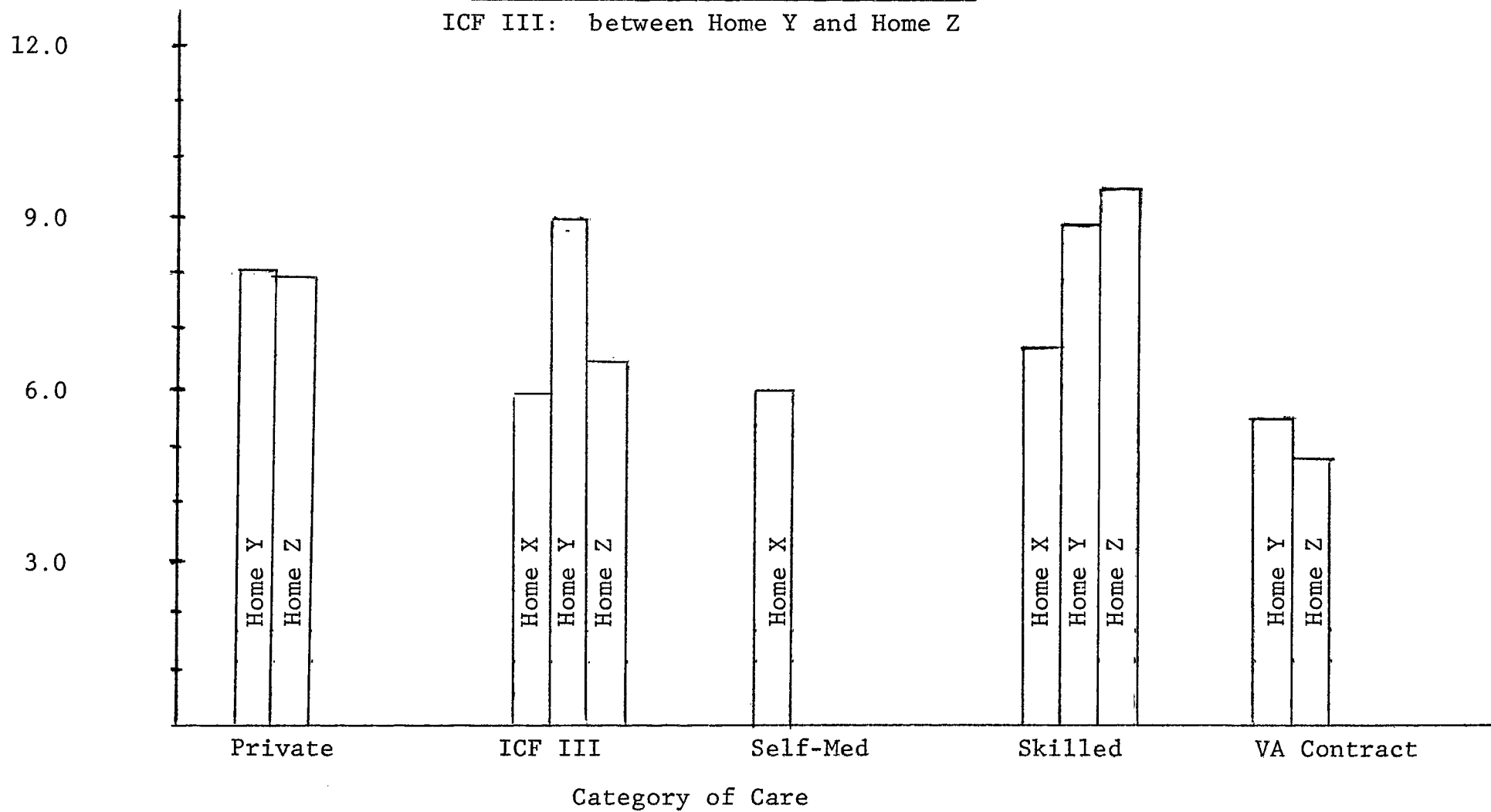


Figure 4

MEAN NUMBER OF DOSES CONSUMED PER PATIENT PER DAY BY CATEGORY OF CARE

7.7 doses consumed per patient per day. The differences in medication consumption was not statistically significant at the  $p < .05$  level.

The data from Table 18 show a wide range of drug consumption for Homes Y and Z ranging from less than 1.99 doses to 33.99 doses per patient per day. For Home X, the mean number of doses consumed ranged from less than 1.99 to 23.99 per patient per day. The most frequent drug utilization rate for the patient population of Home Z was less than 1.99 doses per patient per day. The profession of pharmacy can make a valuable contribution towards the betterment of patient care by conducting drug utilization reviews on patients whose levels of drug consumption make them susceptible to adverse drug interactions.

For the major prescribing physicians in this study, there was considerable variation as to the mean numbers of medication orders prescribed per patient (6.36-14.80) and the mean number of doses consumed (5.91-16.04) per patient (Table 19). The data show that all physicians who prescribed medications for more than 5 patients utilized more legend drugs versus OTC preparations with the exception of the physician (physician #1) from Home X. For those physicians listed in Table 17 the prescribing of scheduled medication was greater than the prescribing of PRN medication. The utilization rate of prescription PRN medication can influence the amount of drug wastage which occurs in a nursing home.

TABLE 18

SUMMARY OF THE MEAN NUMBER OF DOSES CONSUMED PER DAY  
BY FREQUENCY OF STUDY PATIENTS

Mean Number of Doses Consumed per Patient per Day	Frequency of Patients			
	Home X	Home Y	Home Z	Total
less than 1.99	13	13	33	59
2 to 3.99	11	20	27	58
4 to 5.99	8	20	15	43
6 to 7.99	16	16	22	54
8 to 9.99	7	18	22	47
10 to 11.99	4	14	15	33
12 to 13.99	4	12	7	23
14 to 15.99	2	9	9	20
16 to 17.99	2	4	13	19
18 to 19.99	1	4	3	8
20 to 21.99	1	3	3	7
22 to 23.99	1	2	1	4
24 to 25.99	0	1	1	2
26 to 27.99	0	0	0	0
28 to 29.99	0	0	0	0
30 to 31.99	0	0	1	1
32 to 33.99	0	1	1	2
Mean number of doses consumed per patient per day	6.7	8.4	7.7	

TABLE 19

SUMMARY BY PHYSICIANS, FREQUENCY OF PATIENTS BY CATEGORY OF CARE, MEAN NUMBER OF DRUG ORDERS PRESCRIBED, AND MEAN NUMBER OF DOSES CONSUMED PER PATIENT DAY

Physician Code Number*	Nursing Home	Frequency of Patients	Category of Patient Care				Mean Number of Drug Orders per Patient		Mean Number of Drug Orders per Patient		Mean Number of Doses Consumed per Patient day
			Skill	ICF	Private	VA Con- tract	LEGEND	NON- LEGEND	Scheduled	PRN	
1	X	71	49	9	13**	0	4.67	4.74	5.49	3.92	6.70
2	Y	68	8	31	28	1	5.01	3.98	5.44	3.55	7.99
41	Z	61	27	26	2	6	4.11	2.67	4.88	1.90	5.91
55	Z	19	11	8	0	0	3.84	2.52	3.26	3.10	6.73
42	Z	15	9	6	0	0	5.20	2.66	4.66	3.20	7.66
46	Z	11	7	2	2	0	10.90	3.90	7.90	6.90	16.04
4	Y	9	1	5	2	1	7.77	2.22	6.77	3.22	11.03
53	Z	9	4	5	0	0	7.11	3.55	6.66	4.00	13.72
10	Y	8	1	5	2	0	9.75	4.00	8.75	5.00	10.22

\*Physician listed only if patient frequency greater than 5.

\*\*Self-med patients.



By regulation, only prescription medications which have been discontinued due to patient demise, change in medication orders, or patient transfer will be retained for proper disposal. Decreases in the amount of medication for destruction would indicate a greater consumption of "as needed" (PRN) medication or a decrease in the prescribing of such medication.

The data from Table 20 show that Darvon Compound<sup>®</sup> was more frequently prescribed as a PRN medication than any other drug and also had the greatest consumption rate over any other PRN medication. The 1466 doses of Darvon Compound<sup>®</sup> consumed, however, only represented 0.72% of the total drug consumption for Homes Y and Z. Of the 49 patients for whom Darvon Compound<sup>®</sup> was prescribed, eighteen (36.7%) did not consume any of the medication during the three month study period. With the exception of one patient, all non-utilizers of Darvon Compound<sup>®</sup> were residents of Home Y. If oral dosage forms of prescription PRN medication are sent to the nursing home in 30-day quantities, the potential exists (based upon the percent utilization shown in Table 18) for a considerable amount of drug wastage. For Home X, the quantity of drug wastage is not a serious problem since this particular home utilizes a ward stock drug distribution system which is controlled by Pharmacy Service. The results of the drug review conducted on Home X did show that Dalmane<sup>®</sup> was the most frequently

TABLE 20

LISTING BY NUMBER OF DOSES CONSUMED, PATIENT FREQUENCY,  
AND PERCENTAGE OF UTILIZATION OF PRN PRESCRIPTION  
MEDICATION IN STUDY NURSING HOMES Y AND Z

Drug	Number of Doses Consumed	Patient Frequency*	Relative Frequency (percent)**
Darvon Compound <sup>®</sup>	1466	49	0.72
Lomotil <sup>®</sup>	467	48	0.23
Dalmane <sup>®</sup>	769	44	0.38
Valium <sup>®</sup>	1219	37	0.60
Thorazine <sup>®</sup>	361	34	0.17
Darvocet-N <sup>®</sup>	898	31	0.46
Nitroglycerin	33	19	0.01
Tigan <sup>®</sup>	20	19	0.009
Chloral Hydrate	212	17	0.10
Talwin <sup>®</sup>	214	15	0.10
Phenergan <sup>®</sup>	28	14	0.01
Dimetane Expectorant <sup>®</sup>	333	13	0.16
Vistaril <sup>®</sup>	22	12	0.01
Benadryl <sup>®</sup>	86	10	0.04
Placidyl <sup>®</sup>	203	10	0.10

\*Drug listed only if prescribing frequency is greater than or equal to 10 patients.

\*\*Relative frequency (percentage) based upon total number of doses consumed of all prescribed medication.

prescribed PRN legend medication, accounting for 0.94% of the the total drug consumption for that patient population. Legend PRN medication was only prescribed 33 times for the patient population of Home X.

Table 21 illustrates the utilization rate by community nursing home of the most frequently prescribed PRN legend medications. The data show that for Home Z, Darvon Compound<sup>®</sup> was prescribed for 29 patients representing 1.3% of the total drug consumption for that nursing home. The data also show that twelve (63.1%) of the nineteen most frequently ordered PRN legend medications were prescribed for patients in Home Y. Drugs affecting the central nervous system were the most prescribed therapeutic class of drugs, however, analgesics had the highest consumption rate in study nursing homes Y and Z.

Table 22 lists the number and cost of unused drug items awaiting destruction and stored in the administrators' offices at study homes Y and Z. The data show that a considerable amount of medications was discarded and that general legend items provided the bulk of drugs awaiting destruction. Interestingly, the data show that the average cost per day of unused medications in Home Z, with its predominance of Medicaid patients (Table 5), was \$13.27 compared to \$6.97 for Home Y.

The distribution of medication orders by days of the month is represented by Table 23. No attempt is made to depict any particular month or year but rather to show that over

TABLE 21

UTILIZATION OF PRN PRESCRIPTION MEDICATION BY STUDY  
PATIENTS IN STUDY NURSING HOMES Y AND Z

Drug	Nursing Home	Frequency of Medication Orders	Percent Utilization*
Darvon Compound <sup>®</sup>	Z	29	1.3
Lomotil <sup>®</sup>	Y	27	0.4
Valium <sup>®</sup>	Z	27	1.0
Dalmane <sup>®</sup>	Z	23	0.4
Dalmane <sup>®</sup>	Y	21	0.3
Darvon Compound <sup>®</sup>	Y	20	0.07
Darvocet - N <sup>®</sup>	Y	20	0.9
Lomotil <sup>®</sup>	Z	19	0.02
Thorazine <sup>®</sup>	Z	18	0.2
Thorazine <sup>®</sup>	Y	16	0.08
Tigan <sup>®</sup>	Y	15	0.01
Phenergan <sup>®</sup>	Y	12	0.01
Nitroglycerin	Y	11	0.01
Chloral Hydrate	Y	11	0.02
Dimetane <sup>®</sup> Expectorant <sup>®</sup>	Y	11	0.03
Talwin <sup>®</sup>	Y	11	0.01
Darvocet - N <sup>®</sup>	Z	11	0.4
Valium <sup>®</sup>	Y	10	0.04
Placidyl <sup>®</sup>	Z	10	0.1

\*Percent utilization based upon total number of doses consumed for all medications.

TABLE 22

NUMBER AND COST OF UNUSED DRUG ITEMS INVENTORIED AND  
DESTROYED AT STUDY NURSING HOMES Y AND Z

Type of Medication	Home Y (N = 180)*		Home Z (N = 58)*	
	Number of Drug Items	Cost	Number of Drug Items	Cost
Legend	222	\$731.54	159	\$615.48
Narcotic or scheduled	43	126.28	16	38.18
Others**	75	328.42	8	43.60
Dalmane, <sup>®</sup> Librium <sup>®</sup> or Valium <sup>®</sup>	25	68.18	22	72.31
TOTAL	365	1254.42	205	769.57
Average (mean) per day	2.0	\$6.97	3.5	\$13.27

\*N = number of days since last inventory and destruction.

\*\*Others includes unopened multi-dose vials, vaginal suppositories and liquid tranquilizers.

TABLE 23

DISTRIBUTION OF MEDICATION ORDERS FOR PATIENTS IN  
STUDY NURSING HOMES BY DAYS OF MONTH

Days of Month	Frequency of Medication Orders			
	Home X	Home Y	Home Z	Total
1-5	78	190	66	334
6-11	107	200	678	985
12-17	187	190	208	585
18-23	122	550	248	920
24-29	157	140	128	425
30-31	17	46	10	73

a period of time patterns of prescribing do exist with physicians who provide care to nursing home residents.

The monthly distribution of medication orders for the residents of Home X approximate a normal distribution curve with the peak order period occurring between days 12 and 17. The data for Home Y show an approximately equal number of medication orders for days 1 to 17, however, a sharp increase is observed for days 18 to 23. The data for Home Z suggest a bimodal distribution curve with the peak order period for Home Z occurring between days 6 and 11 and another smaller peak occurring between days 18 and 23.

Table 24 illustrates the pattern of discontinued medication orders by days of the month. The data show that for all study homes the frequency of discontinued medications peaked 7 to 10 days after the peak number of medication orders. A 7 to 10 day administration period is usually prescribed for antibiotics or drugs begun on a trial basis.

The most frequently utilized dosing schedule for all study patients was PRN (Table 25). The data show, however, that this particular dosing schedule was influenced by the prescribing habit of the physician from Home X. Twenty-nine percent of all orders written by this physician utilized the PRN dosing schedule. For Homes Y and Z, the once daily dosing schedule was the most utilized. Medications such as multivitamins, diuretics, digoxin, and iron preparations are usually prescribed once daily. Analgesics such

TABLE 24

DISTRIBUTION OF DISCONTINUED MEDICATION ORDERS FOR  
PATIENTS IN STUDY NURSING HOMES BY DAYS OF MONTH

Days of Month	Frequency of Medication Orders			
	Home X	Home Y	Home Z	Total
1-5	30	58	84	172
6-11	21	84	78	183
12-17	34	78	57	169
18-23	43	64	105	212
24-29	22	126	42	190
30-31	14	17	76	107



TABLE 25

LISTING OF DOSING SCHEDULES BY FREQUENCY AND PERCENTAGE FOR MEDICATION PRESCRIBED  
IN STUDY NURSING HOMES

Dosing Schedules*	All Patients		Home X		Home Y		Home Z	
	Frequency	Percent**	Frequency	Percent**	Frequency	Percent**	Frequency	Percent**
As needed (PRN)	582	17.5	198	29.6	215	16.3	169	12.6
Once daily	564	17.0	89	13.3	263	20.0	212	15.8
Twice daily	409	12.3	93	13.9	153	11.6	163	12.2
Every four hours as needed	372	11.2	8	1.2	192	14.6	172	12.9
Four times daily	362	10.9	86	12.9	132	10.0	144	10.8
Three times daily	345	10.4	59	8.8	116	8.8	170	12.7
At bedtime	139	4.2	13	1.9	53	4.0	73	5.5
At bedtime as needed	120	3.6	15	2.2	52	4.0	73	5.5
Four times daily as needed	76	2.3	51	7.6	11	0.8	14	1.0
Every three hours as needed	48	1.4	1	0.1	6	0.5	41	3.1

\*Only ten most frequently prescribed dosing schedules listed.

\*\*Percentage based upon total number of prescribed medications within each study home .

as morphine or meperidine are usually prescribed using the every three hours as needed dosing schedule.

The oral route of administration was most often prescribed (86.8%) for the patient populations in the study homes (Table 26). Variations in alternative routes of administration are seen in the data with the physicians of Home Z prescribing more intramuscular medications while the physicians of Homes X and Y prescribed more rectal medications.

Each drug order was reviewed as to its indication for use and the results (Table 27) showed that, overall, 92.8% of the medication orders have some therapeutic rationale. One hundred fifty eight medication orders (4.8%) were written for unknown problems or reasons not documented in the patients' charts. The majority of these orders were for multivitamin preparations. Sixty-one medication orders (1.8%) were found to be duplications of pharmacologically similar agents already prescribed for the patient. Duplicate medication orders, especially laxatives, were prescribed in 3.4% of all medication orders for Home Z. The data show that 1064 (32.0%) medication orders were routinely prescribed PRN's. These orders usually resulted from either one-time or multiple episodes of minor ailments.

Table 28 summarizes the charting, prescribing, and administration errors noted while conducting the retrospective chart reviews. A total of 477 (0.21%) doses were either

TABLE 26

LISTING OF ROUTES OF ADMINISTRATION BY FREQUENCY AND PERCENTAGE FOR MEDICATIONS PRESCRIBED FOR PATIENTS IN STUDY NURSING HOMES

Route of Administration	All Patients Frequency Percent		Home X Frequency Percent*		Home Y Frequency Percent*		Home Z Frequency Percent*	
Oral	2885	86.8	559	83.8	1145	87.0	1181	88.3
Intramuscular	129	3.9	12	1.8	40	3.0	77	5.8
Intravenous	3	0.1	0	0.0	1	0.1	2	0.1
Sublingual	26	0.8	1	0.1	15	1.1	10	0.7
Subcutaneous	22	0.7	5	0.8	10	0.8	7	0.5
Rectal	120	3.6	62	9.4	43	3.3	15	1.1
Vaginal	4	0.1	0	0.0	4	0.3	0	0.0
Both Eyes	36	1.1	7	1.0	13	1.0	16	1.2
Left Eye	11	0.3	1	0.1	6	0.5	4	0.3
Right Eye	17	0.5	3	0.5	8	0.6	6	0.5
Both Ears	5	0.2	2	0.3	3	0.2	0	0.0
Left Ear	1	0.01	1	0.1	0	0.0	0	0.0
Inhalation	6	0.2	0	0.0	3	0.2	3	0.2
Topical	56	1.7	14	2.1	25	1.9	17	1.3

\*Percentage based upon total number of prescribed medications within each study home .

TABLE 27

## LISTING OF INDICATIONS FOR USE BY FREQUENCY AND PERCENTAGE FOR MEDICATIONS PRESCRIBED FOR PATIENTS IN STUDY NURSING HOMES

Indications for Use	All Patients Frequency Percent		Home X Frequency Percent*		Home Y Frequency Percent*		Home Z Frequency Percent*	
Drug indicated for problem (routine order)	1768	53.2	294	43.9	743	56.5	731	54.6
Drug indicated for problem but no problem in cur- rent record	86	2.6	31	4.6	42	3.2	13	1.0
No known problem or un- known reason since no record in chart	158	4.8	32	4.8	72	5.5	54	4.0
Drug used to treat influ- enza symptoms	38	1.1	13	1.9	7	0.5	18	1.3
Drug prescribed as a re- sult of a consultation	51	1.5	47	7.0	4	0.3	0	0.0
Drug prescribed as a re- sult of evidence of an infection	75	2.3	38	5.7	22	1.7	15	1.1
Drug not indicated for the problem	8	0.2	0	0.0	4	0.3	4	0.3
Routine PRN order	1064	32.0	208	31.1	402	30.5	454	33.9
Drug prescribed for a problem not seen in consultation	2	0.1	2	0.3	0	0.0	0	0.0
Unknown reason-duplication	61	1.8	0	0.0	16	1.2	45	3.4
Order written to satisfy patient or relatives	7	0.2	4	0.3	0	0.0	3	0.2
Drug prescribed despite non-recommendation by consultation	3	0.1	3	0.4	0	0.0	0	0.0

\*Percentage based upon number of medication orders within each study home .

TABLE 28

## LISTING OF CHARTING, PRESCRIBING, AND ADMINISTRATION ERRORS BY FREQUENCY AND PERCENTAGE FOR MEDICATIONS PRESCRIBED FOR PATIENTS IN STUDY NURSING HOMES

Type of Error*	All Patients Frequency Percent of orders		Home X Frequency Percent** of orders		Home Y Frequency Percent** of orders		Home Z Frequency Percent** of orders	
Doses uncharted	451	13.8	172	28.3	95	7.2	184	13.8
No order written	2	.061	1	0.16	1	.076	0	0.0
Wrong drug	2	.061	0	0.0	2	.15	0	0.0
Drug administered after expira- tion of order	10	0.30	9	1.48	1	0.076	0	0.0
Drug administered after physician stopped order	6	0.18	4	0.66	0	0.0	2	0.15
Wrong dose order- ed	1	.030	1	0.16	0	0.0	0	0.0
Wrong dose admin- istered	6	0.18	0	0.0	4	0.30	2	0.15
No errors	2778	85.4	419	69.2	1210	92.1	1149	85.9
Total Doses in Error	477***	0.21	188***	0.42****	100***	0.10****	189***	**** 0.17

\*Listing of frequencies for type of error based upon the number of drug orders with at least one drug error occurrence. For this study, a drug order may have had more than one drug error.

\*\*Percentage based upon total number of drug orders within each home.

\*\*\*Total doses in error is not synonymous with the sum of frequencies.

\*\*\*\*Percentage based upon total number of doses consumed with each study home.

administered, prescribed, or documented incorrectly. The data show that undocumented doses were found in 451 (13.6%) medication orders with documentation problems appearing in 72 (25.7%) of all medication orders for Home X. Eighty three percent of all medication orders written had no apparent charting, prescribing, or administration errors during the three month study period.

The discharge rates for each of the patient populations in the study nursing homes were calculated based upon the number of days patients were in the facility during the study period. The results showed that the discharge rate was 8.6% for Home X, 24.8% for Home Y, and 33.9% for Home Z. Sixty-one (15.9%) patients during the study period were discharged from the nursing home facilities as a result of required hospitalization or demise. These types of discharges are partially responsible for the amounts of unused medication stored at the nursing homes awaiting destruction.

Data on the number of providers of pharmaceutical services for the patients of the community nursing home facilities were collected and the results showed that the patients from Home Y utilized two pharmacy providers whereas fourteen different pharmacies provided services to the patients of Home Z.

The utilization of supportive laboratory data by prescribing physicians was analyzed for each of the study nursing homes. For Home X there were 22 (14.8%) medication orders written

during the study period requiring supportive laboratory tests (as outlined by the study criteria) which were not accomplished. For Home Y there were 49 (48.5%) new medication orders which did not have the required supportive laboratory tests performed, while 46 (64.7%) of the new medication orders for Home Z did not have the required laboratory tests.

As the number of prescribed medications per patient increased the chance for chemical or therapeutic incompatibilities also increased. The results showed that 30 medication orders were prescribed with a total of 765 doses administered which may have resulted in a therapeutic incompatibility or diminished pharmacological activity. One of the more frequent potential incompatibilities was that of the concomitant administration of tetracycline with iron containing preparations or with antacids. The consultant pharmacist can be of immense assistance to the nursing staff by providing in-service training on incompatibilities resulting from concomitant administration of medications.

#### Results of an Alternative Reimbursement Plan

The accurate determination of a capitation fee based upon prescriptions for just Medicaid recipients is nearly impossible since the DPW is usually only billed for the most expensive medications and the three prescription limit does not allow for a true indication of medication consumption. For this study, the patient population of Home Y was utilized for the computation of a capitation fee. The reason for

choosing this particular nursing home was that 99.6% of the patients in this facility utilized the services of one pharmaceutical provider thus providing a highly accurate record of sales, cost of goods sold, and profit for the three month study.

The data from Figure 3 showed no significant differences in the number of medication orders between the private pay patients and Medicaid recipients, thus averting the task of separating the Medicaid reimbursed prescriptions from the private-pay prescriptions. Total sales for the study period minus cost of goods sold yielded a required capitation fee of \$0.32 per patient per day. Data available from the DPW showed that Medicaid was reimbursing for 1.9 to 2.0 prescriptions per month per patient which, if based upon the maximum dispensing fee,<sup>1</sup> would have equated to a daily fee of approximately \$0.16 per patient.<sup>2</sup> The results show that to provide all legend medications utilizing the capitation system would be equal to doubling the current dispensing fee the DPW pays.

Sales data for the study period showed that 1582 prescriptions were dispensed to Home Y. The cost of goods sold for the three month study period was \$0.74 per patient per day if all legend medications were provided under a capitation system. Data from the DPW, based upon 1.9 to 2.0

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<sup>1</sup>At the time of the study period the maximum assigned variable fee was \$2.48. That fee has subsequently been increased to \$2.75.

<sup>2</sup>For fiscal year 1976, the state of Texas reported the average assigned variable fee was \$2.27 which would have equated to a daily fee of \$0.15 per patient per day.



prescriptions per beneficiary, showed that the cost of goods was approximately \$12.94 (daily cost of \$0.43 per patient). The use of a capitation system, based upon the provision of all legend medication, would eliminate the expense associated with patient billing for prescribed medication in excess of the three prescriptions per month allowed under the Medicaid program. Additional patient billing is comprised of the following per statement costs:

1. Statement Form
2. Envelope
3. Stamp
4. Personnel to process statement
5. Bad Debt write-off

For this study, \$0.66 per each additional statement that is now required could be saved if a capitation system was used.

A capitation fee which is based upon true medication utilization data will probably never approach the current DPW dispensing fee (variable fee) which is based upon the premise that no patient will ever receive more than three legend medications. The reduction in the cost of goods sold by eliminating additional billing for prescribed medications in excess of the three prescriptions per month would not lower the capitation fee to a level comparable to the current dispensing fee. Although elimination of additional billing expenses would improve the cash flow situation of the providers, it would do little for the state of Texas and its

Medicaid program.

Another method to decrease the cost of goods sold which would benefit the state of Texas would be to allow generic equivalent substitution. In this study, 21 trademarked drugs were available under generic equivalents for those legend medications with a prescribing frequency of ten or more orders. In most instances, generic medication is available at considerable cost-savings which could be passed on to the DPW or to the private - pay patients. Presently, the law prohibits the substitution of generic products for trademarked items unless specifically agreed upon by the prescribing physician.

#### Results of an Alternative Drug Distribution Plan

The results of this study showed that documentation of medication doses administered and drug wastage were problems under the present traditional methods of drug distribution. The conversion to unit-dose drug distribution would reduce or eliminate these problems. Unit dose drug distribution can be accomplished utilizing strip packaging of individual doses, or "bingo" cards containing 30, 60, or 90 doses of medication. For this study, the dispensing costs associated with the utilization of "bingo" cards were investigated. Those costs associated with purchasing unit dose packaging and distribution hardware are not included.

The cost associated with the provision of a card, labor to insert doses of medication in the card, and other

personnel costs would amount to \$0.30 per card (not including cost of the medication) regardless whether or not 30, 60, or 90 doses were ordered. Since each dose of medication is individually sealed, those doses which were not utilized by the patient could be returned to the provider and proper credit issued to the DPW. The data from Home Y (Table 22) showed unused medication accounted for \$6.97 per day (approximately \$0.06 per patient per day) which could have been saved had unit dose drug distribution been used. Since the provider must utilize personnel to issue credits and process returns, a "handling charge" must be considered. The total number of prescriptions dispensed to Home Y during the study period was 1582. Table 22 shows that 365 prescription items were stored as unused medication from January to June 1976 or approximately 183 items were labelled for destruction during the study period. If unit dose distribution had been employed during the study period, the amount of returns would have been 11.5% of the original number of orders dispensed to the facility. Based upon this return rate, an additional \$0.04 per card would have covered all expenses involved in handling return medications. Based upon a maximum three prescriptions per month per Medicaid beneficiary and a total cost of \$0.34 per card, the cost of utilizing unit dose medications would have been \$1.02 per month, not including the cost of the medication. The amount of medications that were subsequently destroyed, which would have been returned for credit had unit

dose been utilized, was \$1.80 per month (based upon \$0.06 per patient per day). The data would therefore seem to suggest that the cost of unused medication stored at the nursing home, which must be eventually destroyed, may be greater than the cost associated with a unit dose drug distribution system.

## CHAPTER V

## SUMMARY AND CONCLUSIONS

The purpose of this two phase pilot study was to examine the feasibility of replacing both the current reimbursement and drug distribution systems in nursing homes with systems that would improve patient care and provide a better financial return for pharmaceutical providers.

The first phase of this study involved a medical records review of 311 patients in two community nursing homes. Data were collected on patient drug utilization, medical problems, and physician prescribing habits. These results were compared with data obtained in a similar manner from 71 patient medical records at a Federal nursing home. Data were also collected on the utilization of laboratory facilities by the study physicians. Additionally, data were collected on charting, prescribing and administration errors.

The second phase of this study involved the determination of an alternative reimbursement system based upon sales, cost of goods sold, and profit data from the principal pharmaceutical provider to the patients of the 120 bed community nursing home utilized in this study. Data obtained from the Texas State Department of Public Welfare were used to calculate comparative costs under the present system of reimbursement.

This second phase of the study was also concerned with the feasibility of an alternative drug distribution system

based, in part, on data collected as a result of conducting an inventory of unused medications stored in the administrator's office at the 120 bed community nursing home utilized in this study. Additional data on cost of packaging and labor were supplied by the principal provider to the nursing home.

The results from the medical records review showed that the patient population of the Federal facility (Home X) required the highest percentage of skilled nursing care, had the greatest percentage of males, and had the greatest variability in age. Home Z, with a 31% male population, had the next highest level of required skilled care and variability in age. Both Homes X and Z had the highest percentages of patients whose primary diagnosis was cerebrovascular accident or organic brain syndrome. An interesting study would be the correlation of the number of males in a particular nursing facility with certain disease states, such as organic brain syndrome, and the required level of care.

Cardiovascular and cerebral problems were the most frequently recorded reasons for requiring nursing home care for the study patients. The therapeutic agents used to treat these and other problems, however, showed extreme variability between nursing homes. Comparisons of the most frequently prescribed medications in the study nursing homes with studies conducted by Kennard (65), DeNuzzo (54), and the Texas State Department of Public Welfare (64) showed some

similarity among therapeutic agents but very little similarity as to the ranking based upon frequency of ordering. Prescribing studies which are based upon the most frequently submitted prescriptions for reimbursement may not reflect the true prescribing patterns of physicians serving Medicaid patients. Based upon the Texas State Department of Public Welfare Study (64) and the data from this study, the frequency of prescribing questionably effective therapeutic agents for medical problems of unknown etiology should be further investigated. In a study of the Mississippi Medicaid Program, Cobb et al. (24), stated that a negative relationship seemed to exist between popularity, and efficacy and safety. Rational prescribing patterns may develop if the medical audit becomes an established standard and if conclusive studies can be accomplished on those agents with questionable efficacy or indications for use. For example, the continued use of such agents as Hiprex<sup>®</sup> and Mandelamine<sup>®</sup> must be questioned if clinical laboratory tests are not conducted either as a result of unwillingness on the part of the physician to write the orders or unwillingness on the part of the DPW to pay for the tests. Examples of physicians prescribing habits which should be reviewed by a medical audit committee include:

1. The prescribing of furosemide and Slow K<sup>®</sup> every other day or once monthly for "bloating."
2. The prescribing of multiple analgesics such as meperidine for severe pain, Darvon Compound<sup>®</sup>

for pain, Tylenol<sup>®</sup> for mild pain, and aspirin for fever.

3. The prescribing of and the concomitant utilization of multiple laxatives such as milk of magnesia with cascara, Surfak,<sup>®</sup> Dialose,<sup>®</sup> Dialose Plus,<sup>®</sup> and Colace.<sup>®</sup>

A table similar to Table 19 could be used by medical audit committees to review the prescribing of routine PRN's or non-legend medication. This table could be enhanced if drug utilization could be correlated to the medical problems exhibited by the patients.

No significant differences were observed in medication consumption when comparing the total population of each study home. No conclusive evidence was found which would support the hypothesis that drug consumption would increase if restrictions on institutionalized patients were removed. If the hypothesis of increased utilization were completely valid, a significant increase in the consumption rate or prescribing rate should have occurred with the Home X population, since these patients incur no personal costs for medical care and no prescribing restrictions are placed on the physician. Additionally, no significant increases in the consumption rate were observed for the private - pay populations. These individuals should be able to receive as much medication as they are willing to buy or as the physician is willing to prescribe. Further studies should be



conducted on medication prescribing and consumption between various nursing homes and among the levels of care within each nursing home.

Studies which have shown nursing home residents' drug consumption to vary from 4.2 to 16.0 different medications each day (14,15) are valid; however, there are many residents who only consume between 0 and 4 doses per day. The data from Table 19 would seem to indicate that the variability in doses consumed was related to the number of medications available for consumption. The varied utilization of PRN medication observed in this study may be the result of allowing only one reimbursed physician visit per Medicaid patient per month (unless a documented emergency arises). The physician is forced to write excess numbers of orders to cover all possible routine medical situations that may arise, and to utilize the telephone to follow his patients. Responsibility for diagnosing and treating minor ailments, in many cases, is left to the nursing staff many of whom have the minimum training in pharmacology and therapeutics. The greatest service that a consultant pharmacist could make towards the improvement of patient care would be to reduce medication consumption by "rounding" with the prescribing physicians whenever possible or conducting in-service classes to the nursing staff on the uses and abuses of medication. The economic realities of the present system of pharmaceutical reimbursement would make the consultant pharmacist very

unpopular with his colleagues if he improved patient care by reducing medication consumption.

This study has substantiated claims by Mathieson and Rawlings (35) that substantial amounts of medication are wasted under a traditional drug distribution system. The number of unopened multi-dose vials labelled for destruction at both nursing homes Y and Z was considerable. In some instances, multi-dose vials were specified by the physician when ordering medication, probably to take advantage of a lower per unit cost. The number of unopened vials, however, would indicate that utilization of this type of packaging should be held to a minimum. The considerable variation in the amounts of unused medications seen in each study nursing home should be further investigated as to the relationship between the level of patient care and the amount of discarded medication.

The data from this study has shown that admission rates to the nursing homes, frequency of medication orders, and frequency of discontinued medication orders showed considerable variations as to peak periods within each study nursing home.

The need for supportive laboratory tests prior to prescribing a medication varied from practitioner to practitioner within the study nursing homes. The literature, in many instances, offers many varied opinions on proper treatment and is of minimal assistance. It thus becomes a question of

cautionary prescribing versus economics with the latter being the most frequent choice. Schroeder et al. (66) states that physicians' laboratory utilization is not a good index of quality of care. The economic decision becomes even more paramount if the DPW will not pay for the laboratory tests.

Although the capitation system would allow for the provision of all legend medications thus improving patient care, the increased cost of implementing the system probably would not be seen as economically feasible. While conducting this study, three documented cases were found where the patient did not receive medications which were prescribed because of the three prescription limitation and his inability to purchase the additional medication. In one case, the patient did not receive furosemide which had been prescribed for his cardiac disease. Fortunately, the majority of study patients were able to purchase additional medications when ordered.

Rawlings (32) has stated that the expense of establishing a unit dose system may be off-set by recovered discontinued medications. The results of this study would seem to support his contentions. If unit dose distribution is implemented, on-going monitoring will have to be accomplished to insure that increased drug consumption does not occur as a result of improving the distribution system. The state of New Jersey (67) has recently announced a novel unit dose distribution reimbursement plan. A pharmacy maintained unit dose distribution system for Medicaid patients will be

reimbursed \$0.45 per patient per day plus cost of all legend medications. If "bingo" cards are utilized, the state of New Jersey will pay \$0.35 per patient per day plus cost of all legend medications.

Even if the three prescription limitation is maintained in Texas, this study has shown that a fee of \$0.34 per "bingo" card plus cost of medication would make the conversion to unit dose distribution economically feasible. The feasibility of converting to unit dose, of course, depends on recovering unused medication that is currently being destroyed. At the present time, the utilization of "bingo" cards appears to be the most logical choice of packaging. If strip packaging were utilized, it would have to be put into some type of container to fulfill DPW labelling requirements. As long as the nursing home resident is considered an outpatient these labelling requirements will apply.

Documentation and administration errors of the type found in this study could be effectively reduced by implementing unit dose distribution. A major problem which must be clarified before unit dose distribution can be implemented is the question of freedom - of - choice. The most economically feasible unit dose system which can be implemented in a nursing home is one in which all residents participate. The question of freedom - of - choice is currently under debate by the Carter Administration. Its elimination is being considered as part of a reform proposal on the Medicaid

program. (68)

The state of Texas will need to conduct a feasibility study on the actual amounts of medication ordered for and subsequently wasted by its Medicaid population. The data and the figures presented in this study represented the total population of the nursing homes. No attempt was made to separate those prescriptions reimbursed by Medicaid since little significant differences were seen in the drug utilization of the patient populations in the study nursing homes.

## APPENDIX

## Listing of Trademark Drugs

Aldomet<sup>®</sup> - Merck Sharp & Dohme, West Point, PA.  
Benadryl<sup>®</sup> - Parke, Davis & Company, Detroit, MI.  
Cleocin<sup>®</sup> - The Upjohn Company, Kalamazoo, MI.  
Cogentin<sup>®</sup> - Merck Sharp & Dohme, West Point, PA.  
Colace<sup>®</sup> - Mead Johnson Laboratories, Evansville, IN.  
Dalmane<sup>®</sup> - Roche Laboratories, Nutley, NJ.  
Darvocet - N<sup>®</sup> - Eli Lilly and Company, Indianapolis, IN.  
Darvon Compound<sup>®</sup> - Eli Lilly and Company, Indianapolis, IN.  
Dialose<sup>®</sup> - STUART Pharmaceuticals, Wilmington, DE.  
Dialose Plus<sup>®</sup> - STUART Pharmaceuticals, Wilmington, DE.  
Dilantin<sup>®</sup> - Parke, Davis & Company, Detroit, MI.  
Dimetane Expectorant<sup>®</sup> - A.H. Robins Company, Richmond, VA.  
Dimetapp Extentabs<sup>®</sup> - A.H. Robins Company, Richmond, VA.  
Donnatal<sup>®</sup> - A.H. Robins Company, Richmond, VA.  
Elavil<sup>®</sup> - Merck Sharp & Dohme, West Point, PA.  
Esidrix<sup>®</sup> - CIBA Pharmaceutical Company, Summit NJ.  
Haldol<sup>®</sup> - McNeil Laboratories, Inc., Fort Washington, PA.  
Hiprex<sup>®</sup> - Merrell-National Laboratories, Cincinnati, OH.  
Hydergine<sup>®</sup> - Sandoz Pharmaceuticals, Hanover, NJ.  
Lasix<sup>®</sup> - Hoechst - Roussel Pharmaceuticals, Inc., Sommerville, NJ.  
Lomotil<sup>®</sup> - Searle & Company, San Juan, PR.  
Macrochantin<sup>®</sup> - Eaton Laboratories, Norwich, NY.  
Mellaril<sup>®</sup> - Sandoz Pharmaceuticals, Hanover, NJ.  
Pavabid<sup>®</sup> - Marion Laboratories, Inc., Kansas City, MO.

Phenaphen<sup>®</sup> - A.H. Robins Company, Richmond, VA.  
Phenergan<sup>®</sup> - Wyeth Laboratories, Philadelphia, PA.  
Placidyl<sup>®</sup> - Abbott Laboratories, North Chicago, IL.  
Slow - K<sup>®</sup> - CIBA Pharmaceutical Company, Summit, NJ.  
Surfak<sup>®</sup> - Hoechst - Roussell Pharmaceuticals, Inc., Somerville,  
NJ.  
Talwin<sup>®</sup> - Winthrop Laboratories, New York, NY.  
Thorazine<sup>®</sup> - Smith Kline & French Laboratories, Philadelphia,  
PA.  
Tigan<sup>®</sup> - Beecham Laboratories, Bristol, TN.  
Valium<sup>®</sup> - Roche Laboratories, Nutley, NJ.  
Vasodilan<sup>®</sup> - Mead Johnson Laboratories, Evansville, IN.  
Vistaril<sup>®</sup> - Pfizer Laboratories Division, New York, NY.

## BIBLIOGRAPHY

1. Anon: Medicaid questions and answers on Title XIX medical assistance, U.S. Department of Health, Education and Welfare, Medical Service Administration, U.S. Government Printing Office, Washington, DC, 1968.
2. Brownfeld A: Medicaid: the anatomy of the failure of a government program, Private Practice 5: 11-19, 1973.
3. Newman HW: Medicare and Medicaid, Ann Amer Acad Pol Soc Sci 399: 114-124, 1972.
4. Anon: The standards for participation - skilled nursing facilities, State Department of Public Welfare, Austin, Texas.
5. Anon: State Welfare Department gears for Vendor Drug Program, Texas Pharm 90:19 (Jul) 1971.
6. "Panel To Be Named To Eye Welfare Cuts" Houston Post (Dec 19) 1976, sec. A, p. 22.
7. Hopkins CE: Cost sharing and prior authorization effects on Medicaid services in California, part 1: the beneficiaries' reactions, Med Care 13: 582-594 (Jul) 1975.
8. Manard BB, Kart CS and Van Gils DW: Old age institutions, D.C. Heath and Company, Lexington, Massachusetts, 1975.
9. McGuire H: New laws and regulations must focus on continuity of care, Hospitals 49: 63-66 (Oct 16) 1975.
10. Kirk KW: Pharmacy services in nursing homes, opportunities on the horizon, In Anon: Geriatric considerations in drug therapy, Extension Services in Pharmacy, University of Wisconsin, School of Pharmacy, Madison, Wisconsin.
11. Subcommittee on Long-Term Care of the Special Committee on Aging, United States Senate: Supporting Paper No. 1, The litany of nursing home abuses and the examination of the roots of controversy, U.S. Government Printing Office, Washington DC, 1974, p xi.
12. Anon: NARD J 98:10 (Jul 5) 1976.
13. Anon: S Pharmaceut J p 8 (Sept) 1976.
14. Subcommittee on Long-Term Care of the Special Committee on Aging, United States Senate: Supporting Paper No. 2, Drugs in nursing homes: misuse, high costs and kickbacks, U.S. Government Printing Office, Washington DC, 1974, p 270.



15. Lang L and Kabat H: Drug interactions in nursing home patient prescriptions, J Am Pharm Assoc NS 10: 674 (Dec) 1970.
16. Smith JW, Seidl LG and Cluff LE: Studies on the epidemiology of adverse drug reactions, v: clinical features influencing susceptibility, Ann Intern Med 65: 629, 1966.
17. Seidl JG, Thorton GF, Smith JW et al: Studies on the epidemiology of adverse drug reactions, iii: reactions in patients on a general medical service, Johns Hopkins Med J 119: 299, 1966.
18. Hurwitz N and Wade OL: Intensive hospital monitoring of adverse reactions to drugs, Brit Med J 1: 531, 1969.
19. Hurwitz N: Predisposing factors in adverse reactions to drugs, Brit Med J 1: 536, 1969.
20. Lech SV, Friedman GD and Vry HS: Characteristics of heavy users of outpatient prescription drugs, Clin Toxicol 8: 599, 1975.
21. Lofholm P: Psychotropic drug use in San Francisco, In Davis R and Smith W (eds): Drugs and the elderly, University of Southern California Press, p 7-24.
22. Prien RF, Klett CJ and Caffey EM: Polypharmacy in the psychiatric treatment of elderly hospitalized patients, a survey of 12 Veterans Administration Hospitals, Dis Nerv Syst 37: 333-336, 1976.
23. Kane R: Pharmacist role cited in upgrading nursing home care, Wellcome Trends in Hospital Pharmacy 3: 1-3 (Mar/Apr) 1976.
24. Cobb AB, Wilson DP and Abide JM: Use of drugs under the Mississippi Medicaid Program, J Miss State Med Ass 13: 81-84 (Mar) 1972.
25. Lofholm P: Task force on prescription drugs, Department of Health, Education and Welfare, In Davis R and Smith W (eds): Drugs and the elderly, University of Southern California Press, p 7 - 24.
26. Shaw SM: Need for supervision in the elderly receiving long-term prescribed medication, Br Med J 1: 505-507, 1976.
27. Ingman SR, Lawson IR, Pierpaoli PG et al: A survey of the prescribing and administration of drugs in a long-term care institution for the elderly, J Amer Geriatr Soc 23: 309-316, 1975.

28. Stolley PD, Becker MH, McEvilla JD et al: Drug prescribing and use in an American community, Ann Int Med 76: 537, 1972.
29. Balter MB and Levine J: The nature and extent of psychotropic drug usage in the United States, Psychopharm Bull 5: 3, 1969.
30. Congressional Record, S 6855 - 6860 (Apr 27) 1972.
31. Anon: Skilled nursing facilities - standards for certification and participation in Medicare and Medicaid programs, Fed Regist 39: 2215-2246.
32. Philip FR: Rational prescribing and drug usage, Amer J Hosp Pharm 27: 659-665 (Aug) 1970.
33. Eckel FM and McLeod DC: Pharmacy service in small hospitals, Extended Care Facilities and nursing homes, In Francke DE and Whitney HAK, Jr. (eds): Perspectives in clinical pharmacy, Drug Intelligence Publications, Hamilton, Illinois, 1972, p 254-269.
34. Brettschneider CK and Eckel FM: How unit dose can solve some problems of nursing homes, Hosp Pharm 28: 254-259 (Apr) 1971.
35. Mathieson DR and Rawlings JL: Evaluation of a unit dose system in nursing homes as implemented by a community pharmacy, Am J Hosp Pharm 28: 254-259 (Apr) 1971.
36. Rawlings JL and Mathieson DR: Unit dose packaging spurs optimum therapy in project ECF, Pharm Times 36: 50-54, 56 (Oct) 1970.
37. Crawley HK and Eckel FM: Comparison of a traditional and unit dose drug distribution system in a nursing home, Drug Intell Clin Pharm 5: 166, 1971.
38. Beste DC: An integrated pharmacist-nurse approach to the unit dose concept, Am J Hosp Pharm 25: 396-407 (Aug) 1968.
39. Barker K, Brennan J and Heller W: The development of a centralized unit dose dispensing system for U.A.M.C. - part vi, Am J Hosp Pharm 21: 609-625 (Dec) 1964.
40. Tester WW: A study of patient care involving a unit dose system, College of Pharmacy, University of Iowa, Iowa City, Iowa (Jan 1) 1967.
41. Parker PF: This unit dose system is step to future, Mod Hosp 107: 101-103 (Nov) 1966.

42. Weiman W, Whittle S, Schwarz TW et al: Unit dose a challenge to the claim of cost effectiveness in skilled nursing facilities, Calif Pharm p 42-43 (Apr) 1976.
43. Goldenberg H: Why choice of vendor should be challenged, Nurs Homes 19: 67-68 (Feb) 1970.
44. Gagnon JP and Rodowskas CA: Reimbursement methods for pharmaceutical service, J Am Pharm Assoc NS 14: 675 (Dec) 1974.
45. Anon: HEW's second EAC try is better but still not perfect, Drug Top p 10-12 (May 15) 1976.
46. Anon: Apple calls for return to actual acquisition cost, APharmacy Weekly 15: 1 (May 15) 1976.
47. Anon: Medicaid Programs face pharmacy boycotts and lawsuits, Drug Top p 8, 26 (Nov 1) 1976.
48. Ruchlin HS: Long-term care market place, an analysis of deficiencies and potential reform by means of incentive reimbursements, Med Care 13: 979-991 (Dec) 1975.
49. Smith MC: How to control costs in Medicaid programs, Pharm Times 36: 24-30 (Dec) 1970.
50. Roemer MI, Hopkins CE, Carr L et al: Co-payments for ambulatory care, penny-wise and pound foolish, Med Care 13: 457-466 (Jun) 1975.
51. Wertheimer AI: A third party payment proposal, PM p 13-16 (Sept) 1970.
52. Wertheimer AI: The pricing of professional services, J Amer Pharm Assoc NS11: 26, 1971.
53. Wertheimer AI: Retainer fee concept applied to pharmacy, Amer J Pharm 144: 139 (Sept/Oct) 1972.
54. DeNuzzo RV: A profile of prescription services provided to geriatric Medicaid patients in long-term care facilities, Med Marketing Media 6: 13, 1975.
55. Fink JL (editorial): Wellcome Trends in Pharmacy 3: 1-2 (Jan/Feb) 1976.
56. Anon: TPA comments on MAC, Texas Pharm 93: 28-29, 30 (Mar) 1975.
57. Provost GP: The capitation system for pharmaceutical services (editorial), Am J Hosp Pharm 30: 493 (Jun) 1973.

58. Muller C: Drug benefits in health insurance, Int J Health Serv 4: 1, 157 (1974).
59. Nithman CJ, Parkhurst YE and Sommers EB: Physician's prescribing habits, effects on Medicare, J Amer Med Assoc 217: 585 (Aug 2) 1971.
60. Weeks HA: Changes in prescription drug utilization after the introduction of a pre-paid drug insurance program, J Amer Pharm Assoc NS 13: 205, 1973.
61. Rabin DL and Albert MA: Use of physician's services by Medicaid recipients, In Podair S and Speigel AD (eds): Medicaid - lessons for National Health Insurance, Aspin System Corporation, Rockville, Maryland, 1972, p 209.
62. Blancke FW: Geriatrics and gerontology, two rapidly advancing fields, In Anon: Geriatric considerations in drug therapy, Extension Services in Pharmacy, University of Wisconsin, School of Pharmacy, Madison, Wisconsin.
63. AMA Department of Drugs: AMA drug evaluations, Publishing Sciences Group, Inc., Action, Massachusetts, 1973.
64. Jenkins L (ed): Statistical summary of the Vendor Drug Program fiscal year 1976, Texas State Department of Public Welfare, Austin, Texas, 1976.
65. Kennard LH and Roden DR: Dispensing patterns under third party programs, Med Marketing Media 11: 44, 1976.
66. Schroeder S, Schlifftman BA and Piemme TE: Variations among physicians in use of laboratory tests, relation to quality of care, Med Care 12: 709 (Aug) 1974.
67. New Jersey Register, p 19-22 (Jan 6) 1977.
68. Anon: Medicaid freedom of choice coming to an end, Drug Top p 9 (Feb 5) 1977.