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The current study compared utilization markers of 87 frail elderly homebound patients prior to and subsequent to enrollment in an interdisciplinary, physician-led house calls program, as well as measured efforts to increase documentation of advance directives.

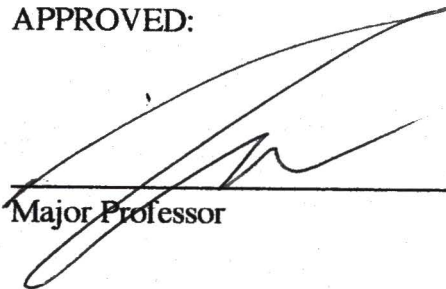
After enrollment in the program the number of hospital admissions ( $p=0.047$ ) and emergency department visits ( $p=0.030$ ) were significantly decreased. The number of admissions to skilled nursing facilities ( $p=0.023$ ) was also reduced, as was length of stay in skilled nursing facilities ( $p=0.018$ ).

The prevalence of advance directives increased from 26% to 74% ( $p<0.001$ ) subsequent to enrollment. Patients who died were more likely to die at home (19) than in the hospital (6). All patients who died at home had documented advance directives.

AN EVALUATION OF AN INTERDISCIPLINARY  
HOUSE CALLS PROGRAM FOR  
THE FRAIL HOMEBOUND ELDERLY

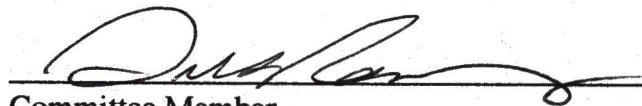
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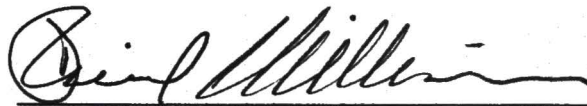
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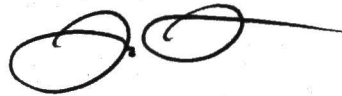
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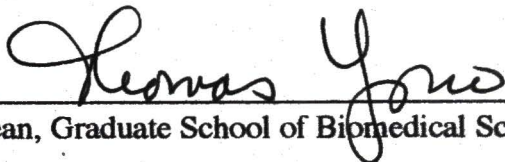
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AN EVALUATION OF AN INTERDISCIPLINARY  
HOUSE CALLS PROGRAM FOR  
THE FRAIL HOMEBOUND ELDERLY

THESIS

Presented to the Graduate Council of the  
Graduate School of Biomedical Sciences  
University of North Texas Health Science Center at Fort Worth  
in Partial Fulfillment of the Requirements

For the Degree of

MASTER OF PUBLIC HEALTH

By

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Fort Worth, Texas

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## CHAPTER I

### INTRODUCTION TO THE STUDY

The number of frail elderly homebound individuals in the United States is growing and will continue to grow over the next 50 years (Brickner, Kellogg, Lechich, Lipsman, and Scharer, 1997). Three and a half million Medicare recipients received some type of health care services in their homes between 1989 and 1995, and the number of agencies providing home health care services increased by 50% (Campion, 1995; Welch, Wennberg, & Welch, 1996). However, despite a rapid growth of home health care services available to patients in the 1990s, many patients in this demographic continue to have difficulty accessing care from physicians and mid-level practitioners.

Not only is the population of homebound elderly individuals on the rise, but this is a population that has special needs. A 1986 study in Quebec illustrated a number of “geriatric syndromes” many elderly patients face. It was determined that over 31% of community dwelling individuals over age 60 years suffered from some type of “disability.” These disabilities included impairments in mobility, agility, vision, hearing, and speech. The frequency and severity of disabilities rose sharply with age, with well over 50% of those 80 years or older suffering from one or more of these impairments. (Carriere, Jenkins, Gupta, & Legare, 1996). In addition to increased age putting elderly individuals at greater risk for disability, homebound status itself has been associated with



a history of recent acute hospitalization and fair to poor self-rated general health (Gangguli, Fox, Gilby, & Belle, 1996).

Another important issue for many elderly individuals is their preference regarding end of life care. In 1990, the passage of the Patient Self-Determination Act recognized that patients needed better access to information about advance directives, or end-of-life decision making, and the new law provided physicians and patients with new procedures and documents to better assist in planning for dignified and compassionate end-of-life care (Ott, 1999). However, in spite of this need being recognized by the law, many patients are still not communicating their own end-of-life desires with their families and physicians (Robinson, Dehaven, & Koch, 1993).

In the early 1900s, it was not unusual to find doctors routinely making house calls to treat patients, but house calls in the second part of the century did not survive as mainstream health practices (Berstein, Grieco, & Dete, 1987). The development of medical technology and the institutionalization of health care has caused a decline in house calls made by physicians from 40% of all patient-physician visits in 1930 (Starr, 1982) to 0.6% in 1980 (Driscoll, 1991). This suggests that many homebound individuals who are unable to get to the doctor's office for care often utilize hospitals and emergency rooms as their primary source of treatment for acute and chronic medical problems (Fried, Wachtel, & Tinetti, 1998).

A variety of interdisciplinary programs have been studied among different elderly populations. Although some studies of geriatric assessment interventions have been

controversial, a meta-analysis demonstrated that a comprehensive geriatric assessment program could lead to a 14% reduction in mortality, and a 12% reduction in hospitalization. This meta-analysis also showed that interventions were more likely to be effective if they targeted highest-risk patients, delivered (rather than recommended) care, and extended their intervention over time (Stuck, Siu, Wieland, & Reubenstein, 1993).

Although there is a wide range of general information available on home care services for the elderly, little is known about the effectiveness of specific home-based interventions. Specifically, there is an urgent need to investigate the benefits of providing interdisciplinary home health care programs that include house call visits by physicians and mid-level practitioners (Siu, 1997).

### Geriatric Care

Current patterns of health care utilization suggest there will be a significant increase in health care expenses as the elderly population continues to grow (Carriere, et al., 1996). More people in this population will survive to advanced ages where they will typically have greater health care needs. In addition, the longer individuals live, the more years they will be utilizing health care services in general (Denton & Spencer, 1987). The health care system would do well to make changes now in the way this population is served to minimize unnecessary strains on the system later. While many of today's seniors are interested in maintaining their autonomy, the amount and type of assistance they will need to maintain desirable health status will vary immensely.

While the majority of the United States senior citizen population receives their health care benefits through the government sponsored Medicare program, 5% of Medicare enrollees account for 55% of Medicare-paid days spent in the hospital (Gruenberg, Tomkin, & Porell, 1989). Even more strikingly, this same 5% also accrues 62% of Medicare hospital expenses (Riley, Lubitz, & Prihoda, 1986). This phenomenon of a small group of individuals accumulating the majority of health care expenses is not unique to the United States. Even in Canada, where a universal health care system is in place, the elderly exhaust a disproportionate amount of health care dollars. In Quebec in 1980, only 8.7% of their population was over age 65, but this small group consumed 37.4% of the public health and social service expenses (Carriere, et al., 1996).

Although the majority of community-dwelling senior citizens do not exhibit significant physical, sensorial, or psychological disability (Carriere, 1996), the group of individuals who do suffer from one or more of these problems appear to be at significant risk for future deterioration of their health. A variety of studies have attempted to identify characteristics which may place the elderly patient at greater risk. From 1984 to 1988, Boult, Dowd, McCaffrey, Boult, Hernandez, and Krulewitch (1993) studied a longitudinal cohort of 5,876 elderly individuals who were still living in their homes. It was discovered that risk factors for multiple hospitalizations within that four year time frame included: increased age, male gender, poor self-rated general health, availability of an informal caregiver, a history of coronary heart disease, diabetes mellitus, a hospital admission in the year prior to the study, and six or more doctor visits in the preceding



year. This data was then used to compute an index to be used as a prospective identifier of elderly patients at high risk for hospitalization. After a one year follow-up, patients with higher indices were found to have twice as many hospitalizations and costs than patients with lower indices (Pacala, Boulton, & Boulton, 1995).

Numerous studies have demonstrated that the chronically ill and disabled are the population with the greatest need for supportive care at home. In 1988, 46% of community-dwelling 85 year-olds fell into the category of "frail elderly," and were prime candidates for long-term maintenance home care (Solomon, 1988). While a variety of studies have suggested that long-term maintenance home care can improve patients' "quality of life" (Council of Scientific Affairs, 1990), and still others have documented improvements on patients' cognitive status (Hughes, Conrad, Mannheim, & Edelman, 1988), some question the "medical necessity" of such care. A study addressing this question was performed in Minnesota on a group of "at risk" frail elderly patients who were receiving Medicaid-funded home care. It was discovered that eight months after home care had been discontinued for some patients due to funding cuts, these patients had twice as high hospitalization and mortality rates as the patients who were still receiving home care (Woodworth, 1987). Studies such as this demonstrate both the "medical necessity" and effectiveness of home care.

Intuitively it seems that homeboundness may be the result of failing health and functional disability, and that being at home with limited access to care will cause these individuals to become progressively debilitated. To identify more specifically what

some of the characteristics of homebound adults may be, Ganguli, Fox, Gilby, and Belle (1996) performed an epidemiological survey of elderly adults living in a rural Pennsylvania town. Of the 878 individuals surveyed, it was determined that 10.3% were classified as "homebound." This homebound status was found to be significantly associated with being older, female, widowed, impaired mental and functional status, increased depressive symptoms, low social support, fair to poor self-rated general health, weight loss, and histories of stroke, angina, spinal arthritis, and falls (Ganguli, et. al., 1996).

Delivering health care services in the home has long been a tradition among health care providers, and it has only been recently that these services have become primarily institutionalized (Keenan & Fanale, 1989). In the United States in the mid-1940s, numerous advances in technology changed the practice of health care to a hospital-and-clinic based setting (Koren, 1986). With the proliferation of automobiles and with computers and telephones providing ample means of communication, medical practices became more institutionalized and physician house calls began to further decline (Bowling, 1997).

When an individual's medical condition and functional ability deteriorate to a point where there is extreme difficulty in transferring the patient from their home to another location, the patient is considered "homebound." Often patients' only means of leaving their homes is with the assistance of paramedics, wheeled gurneys, etc. This is both physically and emotionally straining on these patients and their families, and can

also prove to be quite expensive. Although all it takes is a single phone call to have the daily newspaper, new furniture, or a pizza delivered right to your front door, necessary primary medical services are still difficult for many homebound patients to obtain.

When individuals become homebound, not only does access to primary care become more restricted, but access to preventive care becomes restricted as well. When Beers, Fink, and Beck (1991) synthesized the findings of the U.S. Preventive Services Task force, the recent literature, and the consensus of experts in geriatrics, gerontology, and health policy research, they determined there were a number of prevalent disorders in the elderly population that could be treated if they were identified. They unreservedly recommended screening the elderly for vision problems, fungal infections, skin cancer, drug eruptions, hearing difficulties, constipation, dental caries, hypertension, and breast cancer. These disorders are common among the elderly, and when identified early are more easily treatable. Data such as this supports the intuition that homebound elderly adults have a disproportionate share of morbidity and disability, and have limited access to appropriate primary and preventive health services.

In addition to concerns about access to basic medical care, many homebound individuals also have an interest in discussing end-of-life issues. The overwhelming majority of people suffering from life-threatening illnesses say that they prefer to spend the end of their lives at home (Ratner, 1998). The function of a hospital emergency room is often to keep people alive, but the value placed on prolonging lifespan is not necessarily shared with the majority of geriatric patients. The health related values and



preferences of a group of geriatric patients showed that 82% valued quality over quantity of life (Mold, Looney, Viviani, & Quiggins, 1994). 85% also considered a permanent vegetative state to be worse than death (Mold, et al., 1994).

Advance directives are legal documents that allow competent adults to maintain control over their end-of-life care by recording their preferences about life-sustaining treatments. Additionally, advance directives also give patients the opportunity to authorize a proxy to make medical decisions, should the individual become unable to make them. A recent study showed that 90% of patients and physicians supported the idea of recording advance directives, but only 15 % of patients actually had them documented (Gordern & Dunn, 1992). With such seeming disparity between what patients wanted and what they were actually communicating with their physicians, legislation was passed to ensure that patients would be made aware of their right to document end-of-life decisions.

In 1990, the federal Patient Self-Determination Act was passed and it requires that patients in hospitals, nursing homes, HMOs, home health agencies, and hospices be informed about advance directives and their rights regarding the acceptance or refusal of treatment (Wolf, et al., 1991). Although this law makes discussion of advance directives a routine part of many health care experiences, the proportion of those actually completing advance directives remains small (Robinson, DeHaven, & Koch, 1993). Although the Patient Self-Determination Act may have increased patients awareness about advance directives, it does not appear to have increased their propensity to act on

this awareness. Perhaps not only raising awareness, but also educating patients about how they can maintain control over how they will spend the end of their lives will increase documentation.

While physician involvement in house calls has been decreasing, home care as a whole has been a rapidly growing field. In the 1980s, while the utilization of institutional beds decreased by 2% each year, the growth rate of the home health care industry had an annual increase of 20% (Kavesh, 1986). For example, in 1974, only 393,000 home health visits were made in the United States, but in 1992, the number of visits increased over sixfold to 2,506,000 visits (Vladeck, Miller, & Clauser, 1993). Home care has a unique definition that is different from "house calls." "Home care" is generally defined as a service through which equipment and services are provided to patients in their homes for the purpose of restoring or maintaining acceptable levels of comfort, function, and health (Council on Scientific Affairs, 1990). Home care services are provided in patients' homes by nurses, physical, occupational, and speech therapists, social workers, and a variety of paraprofessionals (Bowling, 1997). These home care agencies usually have physician oversight, but these physicians rarely participate in direct patient contact. Conversely, "house calls" are in reference to visits made by physicians or mid-level practitioners, such as physician assistants or nurse practitioners, where primary health care services are provided in patients' homes.

Although the aged population continues to increase, physicians have become less likely to provide house calls. In fact, the number of physician-made home visits declines

annually (Keenan, Bland, Webster, & Meyers, 1991). Hirsch and Winograd (1992) surveyed medical directors of primary care clinics in California and found that only 20% of the clinics routinely provided house calls to their homebound elderly patients.

A variety of reasons appear to be contributing to the unwillingness of many currently practicing physicians to perform house calls. As physician house calls have ceased to be a part of mainstream medical practice, more recently trained physicians have often had little education in this arena. They may feel uncomfortable with the unfamiliarity of providing health services in the home. Additionally, making house calls is time consuming and the reimbursement available for this type of service is often inadequate, given the time and effort required to provide house calls (Bowling, Retchin, Ellis, & Pancoast, 1990; Council on Scientific Affairs, 1991).

A recent survey of Colorado family physicians suggests that some practitioners are willing to make occasional house calls; 53% of the respondents reported making house calls, with 8% making more than two house calls per month (Ingram, O'Brian, Gonzalaz, Main, Barley, & Westfall, 1999). Their survey indicated that while the overall attitude of physicians was positive towards house calls, few routinely perform them. They suggested that males, physicians over age 40, rural physicians, and those trained in a community-based residency program were the most likely candidates to perform house calls (Ingram, et al, 1999). This substantiates previous research that suggests physicians practicing in rural communities are more likely to perform house calls (Adelman, Fredman, & Knight, 1994; Keenan, et al., 1991).



Reasons why many physicians favor house calls but fail to provide them are varied. A physician's willingness to perform house calls appears to be dictated by factors including specialty, previous experience, and location of practice. When Adelman, Fredman, and Knight surveyed primary care physicians, they discovered that 63% of family practitioners, 47% of internists, and 15% of pediatricians made house calls (1994). In another study, physicians who had additional training post-residency were significantly less likely to make house calls (Richardson, Fredman, & Daly, 1993). Previous experience, including educational exposure to providing house calls also impacts the willingness of physicians to perform house calls (Bowling, et al., 1990; Adelman, et al., 1994). In a survey of family practitioners who received residency training in the 1980s, only 20% of their training programs required home care experiences, and even fewer required a significant number of home visits as part of their training (Knight, Adelman, & Sobal, 1991).

This lack of adequate medical education regarding house calls appears to be a significant reason house calls have been declining. In the past 30 years, medical schools and residency programs have provided little, if any, information or experience in the provision of home care by physicians (Taler, 1998). Subsequently, few physicians understand how to adequately provide appropriate care to patients in their homes.

Historically, inadequate reimbursement has been another barrier to the provision of house calls. However, because of the efforts of the American Academy of Home Care Physicians, Medicare has recently made many revisions in the rules for reimbursement

for home visits (CFR 42, Medicare program, as cited in Taler, 1998). Although future changes are still necessary, new Medicare codes do allow for a more reasonable reimbursement schedule that makes house calls a more financially viable option. New codes also allow for the assessment of patients' complex medical problems as well as their treatment. A second major change is that Medicare will now partially reimburse for mid-level practitioners, such as advance practice nurses or physician assistants, to provide services in the home without the supervision of an on-site physician. Mid-level practitioners are very capable of assessing and monitoring patients' progress and physicians can then be effectively used to assist with patients' more complex problems (Taler, 1998).

The American College of Physicians and the American Medical Association concur that access to health care is often difficult for homebound patients. They suggest that for some patients, medical care is more accessible through home visits by mid-level practitioners and physicians than through traditional office visits (Health and Public Policy Committee, 1986; Council on Scientific Affairs, 1990).

In a recent national survey, only 2% of 1,161 physicians contacted reported over 100 annual house calls. With such a large and growing population of frail elderly homebound individuals in our communities, it is time that physicians expand their typical home care role as administrators or off-site consultants, and once again become primary care providers. The role of physicians in home care should include communication with

providers, communication with patients and families, authorization of services, and home visits when necessary (Barry, 1996).

### Interdisciplinary Teams and Comprehensive Geriatric Assessment

Interdisciplinary teams of health professionals with different expertise, gathered to assess, evaluate, and treat the homebound elderly in their homes, are an excellent vehicle through which comprehensive geriatric care can be provided. When physicians, nurse practitioners, social workers, psychologists, nurses, therapists, chaplains, and other health care providers work together to provide care as a team, the physical, psychological, social, and spiritual needs of patients can be evaluated and improved if necessary. Bringing different health professionals together to assess each patients' myriad of needs has been shown to be most helpful when team members have frequent communication with each other (Bowling, 1997).

The process of team members shaping comprehensive individual care plans for elderly patients is referred to in the literature as "comprehensive geriatric assessment." Although previously used primarily for the evaluation and rehabilitation of the chronically ill (Rubenstein, Josephson, & Wieland, 1988), effective preventative care can be achieved for the homebound elderly by an assessment of their biologic, psychologic, social, and environmental risk factors (Guralnik, Ferrucci, Simonsick, Salive, & Wallace, 1995). This type of comprehensive geriatric assessment has been demonstrated to



improve the health outcomes of patients when subsequent recommendations were implemented (Stuck, Siu, Wieland, & Rubenstein, 1993).

Home assessment of how health, environmental, and social factors may impair patients' functional abilities and quality of life can play an important role in the treatment of frail elderly patients (Ramsdell, 1991). Assessments in the home can often provide valuable information regarding health or social problems that might not be noted during a clinical visit. In fact, a study comparing information gathered by comprehensive geriatric home assessments with information from their medical charts found that much more valuable information was obtained from the comprehensive home assessment (Lemkau, Martin, & Olsen, 1993). They found that problems with family or social support, poor dental care, and immunization deficiencies were frequently identified with geriatric home assessments, but were rarely noted in their medical charts (Lemkau, et al., 1993).

In a 1995 study, researchers designed and implemented a multidisciplinary intervention to prevent the hospital readmission of elderly adults with heart failure (Rich, Beckham, Wittenberg, Leven, Freedland, & Carney). Their intervention was led by nurses and also included services provided by social service workers, physicians, dietitians, and home health care providers. They found that their intervention was able to significantly improve quality of life and reduce hospital use and medical costs (Rich, et al., 1993).

The benefits of numerous interdisciplinary geriatric assessment programs have been studied. A consultative outpatient geriatric assessment program was found to improve the diagnosis of common health problems such as cognitive impairment, depression, and incontinence (Silverman, Musa, Martin, Lava, Adams, & Ricci, 1995). Although no differences in mortality, nursing home admissions, cognitive health, functional abilities, or health services utilizations were observed, they were able to improve diagnosis of common problems, reduce anxiety levels of patients, and reduce stress levels of caregivers (Silverman, et al., 1995).

Since the most supportive research on comprehensive geriatric assessment has stemmed from programs involving long inpatient stays, California researchers initiated a trial of comprehensive geriatric assessments in the care of hospitalized geriatric patients (Reuben, et al., 1995). The geriatric assessments in this trial were provided as a consultation service with limited follow-up. Survival rates and functional status of participants in the intervention and control groups were similar. This lead researchers to conclude that a hospital-based program of comprehensive geriatric assessment consultations did not improve the health or survival of its patients. However, it may have had positive effects such as increased satisfaction or decreased levels of anxiety or stress, but these variables were not measured (Reuben, et al., 1995).

Elsewhere in California in 1995, a program of in-home comprehensive geriatric assessments was studied (Stuck, et al.). Geriatric Nurse Practitioners saw patients in their homes, and in collaboration with physicians, evaluated current problems and risk

for disability, gave specific recommendations, and provided health education services. Participants of this program were able to delay the development of disability and reduce permanent nursing home stays (Stuck, et al, 1995).

Overall, individual trials of the usefulness of comprehensive geriatric assessments have produced conflicting results. One meta-analysis looking at 28 controlled trials was able to identify comprehensive geriatric assessment programs that were associated with positive outcomes (Stuck, et al, 1993). They found that inpatient units providing comprehensive geriatric assessment and rehabilitation as well as programs providing assessment in the home were the most likely to decrease mortality. These programs, along with home assessment programs for patients just released from the hospital, also helped patients to remain living in their homes. However, inpatient consultation assessment services and outpatient assessment services alone did not. Overall, meta-analysis researchers showed that programs that could maintain control over medical recommendations and extended ambulatory follow-up were more likely to have a beneficial outcome (Stuck, et al, 1993).

If these types of comprehensive assessment are performed on each new patient entering a house calls program and the patients obtain their primary care from this team, an interdisciplinary house calls program might be an excellent venue through which these preventive services could be provided.



### House Calls Programs

The growth in home care services has sparked renewed interest in physician-led house calls, but little has been done to scientifically demonstrate the beneficial effects that home-based comprehensive primary care programs can provide. A recently published annotated bibliography on home care research further illustrates the point that although there is a wealth of research on home care for geriatric patients, physician-led programs providing assessment and treatment in patients' homes have not been widely studied (Steel, Leff, & Vaitovas, 1998).

When physicians have direct contact with patients, as they often do in house calls programs, they can provide better quality of care. When physicians prescribe home health care services to patients, these services are often provided by a variety of agencies, depending on patients' preferences. This makes it very difficult for physicians to monitor the health status of their patients on a regular basis. However, if a team of providers is working together to care for a group of patients, regular communication makes it much easier for physicians to monitor their patients' conditions.

Although there is much literature available on general home care and how various programs or interventions have positively affected health outcomes, there are few outcome-based studies of physician-led house call programs. In 1973, a Chelsea-Village Program interdisciplinary team made its first visit to a frail elderly woman in her home (Brickner, et al., 1997). Over 200 patients have been seen in the program to date, and anecdotal evidence demonstrates the benefits of the program. The interdisciplinary staff



has done its best to provide diagnostic services and treatment to an ethnically diverse group. They have utilized social service workers as well as volunteers to help patients and their families continue to care for their aged relatives in their homes. End-of-life issues were also handled with an interdisciplinary approach. Demographic information collected on patients in this study helps to identify common characteristics of homebound patients so that future interventions may take these characteristics into account.

Unfortunately, due to the nature of how the program was implemented, aside from anecdotal reports, it is difficult to ascertain the actual effectiveness of the program.

Descriptions of a variety of other house call programs have also been published. A physician-led Elder House Call program initiated at Johns Hopkins University was one of the first to establish an ongoing relationship between an interdisciplinary house calls staff and the nursing agency providing home health care services to its patients (Finucane, 1997). Two other important factors that have led to what Finucane and his colleagues would likely describe as a successful intervention include having a primary care coordinator and weekly staff meetings. The patient care coordinator is responsible for numerous duties including triage and communication between chronically ill patients and their families, home health care providers, physicians, and ancillary service providers. This helps provide patients with the best possible continuity of care. The weekly staff meetings also allow all the members of the interdisciplinary team to be informed of any new or developing problems patients may be experiencing (Finucane, 1997). Although data is not available to scientifically measure the impact of the Hopkins

program, and they report to operate at a financial loss, they have recognized the program as an important teaching tool to help expose geriatric internal medicine residents to the value of house calls. This program is innovative in its employment of numerous mechanisms that facilitate communication among team members, patients, and their families.

In 1981, a home visit program (HVP) was implemented as part of a family practice residency program in Philadelphia (Perkel, 1997). This program allows new physicians to gain experience in house calls, and also provides a helpful service to the community's homebound individuals. In this program, initial house calls were made strictly to evaluate the home situation and subsequent visits would be in the office. However, as the program progressed, a number of patients also received additional visits in the home. Although descriptive data concerning HVP patient hospitalization rates is available, there is no mechanism in place to use that data to determine the effectiveness of this program.

A 1998 study was designed to assess the ability of a medical house calls program to meet the medical needs of homebound patients (Fried, Wachtel, and Tinetti). These researchers found that the majority of the patients they enrolled in their program were female (81%), 85 years old or more (52%), and were dependent in at least one activity of daily living. Patients in this program received an average of 5 visits per year, and were treated for a wide variety of problems ranging from upper respiratory tract infections to pneumonia and congestive heart failure. Several of the patients were helped

to manage complex illness in their homes. One fourth of the patients or their health care proxies opted to avoid hospitalization treatment. Researchers concluded that a wide range of medical problems could be managed in patients' homes. They believe that since these patients were unable to leave their homes, they likely would not have received routine medical care at all and would have used emergency rooms for treatment of acute problems had house calls not been available (Freid, et al, 1998).

### The Baylor Elder HouseCalls Program

Homebound elderly individuals have a higher risk of hospitalization than their age-matched, community dwelling peers. In addition, interdisciplinary approaches to identifying and treating high risk elderly patients have been demonstrated to have beneficial effects on patients' health as well as hospitalization rates. Finally, although few controlled trials have been published, in some cases house call programs have been demonstrated to have positive effects on patients' functional abilities as well as rates of institutionalism. The Baylor Elder HouseCalls Program has synthesized the research findings in these areas to create a program through which frail elderly homebound patients can receive medical care. Upon enrollment, patients undergo comprehensive geriatric assessment by an interdisciplinary team and receive longitudinal primary care via physician and geriatric nurse practitioner (GNP) house calls.



### Structure of the Baylor Elder HouseCalls Program

The HouseCalls program is administratively housed in an ambulatory geriatric assessment practice located near a large urban hospital facility. The interdisciplinary HouseCalls practice is currently staffed by a geriatrician, geriatric nurse practitioners (GNPs), a registered nurse patient care coordinator, graduate research assistants, a dietitian, a social worker, and home care nurses. Daily rounds between the GNPs and geriatrician, as well as weekly meetings, assure excellent communication within the team.

The HouseCalls program serves a large area of the Dallas metroplex within a 30 mile radius of Baylor University Center, including a considerable inner city population designated as medically underserved by federal criteria. Research has demonstrated a link between socially disadvantaged older individuals and poorer health outcomes (Mathers, 1994). Patients were referred primarily by Baylor Senior Health Center personnel and Baylor Home Care nurses, but as the program continued to grow, referrals were made by other sources as well. Referred patients were contacted by the patient care coordinator and a home visit was scheduled. In this population, initial comprehensive geriatric assessments were performed by GNPs, a geriatrician, and a medical social worker. Following the initial comprehensive assessment, patients accessed the program via telephone, where the registered nurse patient care coordinator performed telephone triage. Home visits were scheduled when necessary and were performed by the nurse



practitioners. All home visits were discussed with the program's geriatrician daily and visits were performed by the geriatrician as needed for optimal patient care.

Home nursing services that were deemed medically necessary for homebound patients' well-being were provided by the Baylor home nursing agency. All HouseCalls patients' medical records were fully computerized. This not only meant that providers had easy access to pertinent information about patients, but the computerized system also allowed for the generation of health promotion reminders and a variety of quality-control measures.

If HouseCalls patients experienced problems after-hours, they were instructed to contact the answering service of the Baylor Senior Health Centers. If it was determined that the patient needed an acute evaluation, the nurse practitioner or physician who was sharing call for the HouseCalls patients was contacted. This provider would either make a home visit, refer the patient to the Emergency Room, or make arrangements to see the patient in the Emergency Room him or herself.

#### Process of Care Delivery

Upon referral of a patient to the HouseCalls program, the patient care coordinator would contact the referred patient or that patient's caregiver to obtain additional information. If the patient met the designated inclusion criteria of being homebound and dependent in ambulating, lived within a 30 mile radius of the center, had been hospitalized at least once in the past 12 months, had a minimum of one visit to an

emergency room in the past six months, and was over 65 years old, an initial assessment home visit was scheduled.

The in-home comprehensive geriatric assessments are interdisciplinary in nature, and are intended to focus on the entire bio-psycho-social status of the elderly patient. This comprehensive assessment included measures of the patients' neurocognitive functioning, functional status, affective status, social situation, health history, as well as a complete medical/physical evaluation. Specific assessment tools utilized included a detailed health history questionnaire, Folstein's Mini-Mental Status Examination (MMSE), Geriatric Depression Screen (GDS), Activities of Daily Living (ADL), Independent Activities of Daily Living (IADL), Clinical Dementia Rating Scale (CDR), and a Caregiver Burden questionnaire.

Folstein's Mini-Mental Status Examination is a widely used tool to assess cognitive status. Although it is difficult to use with patients who are non-verbal or who have severe dementia, it has been validated and utilized in previous research studies and was utilized in this program because it is easy to administer, and it is not time consuming (Folstein, Folstein, & McHugh, 1975).

Depression is common among the elderly. The Geriatric Depression Scale has been compared to other depression scales and has been shown to be a reliable and valid screening device for measuring depression in elderly patients. It was used in the HouseCalls program because it has been shown to be sensitive to depression among

elderly individuals suffering from mild to moderate dementia and physical illness (Sheikh & Yesavage, 1986).

ADLs are assessed by asking patients or their caregivers the amount of assistance the patient needs to complete basic activities of daily life such as bathing, toileting, and feeding. IADLs measure activities that are instrumental to autonomy, including the abilities to prepare food, perform housekeeping tasks, and adhere to medical regimens. A variety of indices have been developed to quantify this information, and some researchers have concluded that Katz's index is preferred in clinical decision making due to its high predictive validity (Toernquist, Loevgren, and Soederfeldt, 1990).

The CDR was used as an additional rating tool to comprehensively estimate a patient's level of dementia based on abilities across different dimensions. Categories include memory, orientation, judgment, community affairs, home life, and personal care. Although the scale has been validated and used in other studies of the elderly, rules for assigning profound and terminal stages of dementia have not been established (Baylor Assessment Materials, 1996).

Few instruments are available to measure caregiver stress, but for the purpose of this program eleven questions regarding the stress of caregiving were used from the Burden of Care Interview. Caregivers were asked to respond "yes" or "no" to questions about how caregiving has affected their lives. As research into the problems of providing care for the elderly continues, ideally appropriate assessment tools will be validated for use with this specific population.



Based on information gathered during comprehensive geriatric assessments, individualized care plans were developed for each patient enrolled in the HouseCalls program. Arrangements for the provision of ancillary services such as home nursing or other home-therapies were made on an individual basis. Home visits were scheduled by the patient care coordinator as needed. Even if no home visits were requested by the patient or the patient's caregiver, HouseCalls patients were routinely evaluated by a nurse practitioner every three months to monitor chronic conditions and to identify the development of additional problems.

#### Purpose and Hypotheses

The current historical cohort study will compare health care utilization markers of patients prior to and subsequent to enrollment in an interdisciplinary, physician-led house calls program. It will evaluate the effectiveness of a program for which numerous other studies have indicated there is a significant need.

It was hypothesized that patients who were enrolled in the pilot phase of the Baylor Elder HouseCalls Program would have significantly lower hospitalization rates and other utilization markers than the year prior to them joining. It was also hypothesized that one year after enrollment there would be an increase in the number of patients who have documented advance directives, and the proportion of these documentations would not significantly differ across race. Finally, it was proposed that



among HouseCalls patients who do die, more would die at their place of residence than in the hospital.

## CHAPTER II

### METHODS

#### Subjects

The data used for this study was taken from a large data set that had been collected about patients who were enrolled in the pilot phase of the Baylor Randomized HouseCalls and Hospitalization in the Homebound Elderly study.

#### Procedure

Before enrollment into the program, all patients, or their proxies, as well as the patients' designated primary caregiver provided informed consent indicating that they understood it was a new program, and that it was likely researchers would be using data from their medical charts to demonstrate the effectiveness of the program. In addition to keeping hard copies of patients' medical charts, records were also computerized.

After patients had been enrolled in the HouseCalls program for a minimum of one year, a research assistant contacted each patient or their family members to gather additional information that would help to illustrate the effectiveness of the program. These follow-ups were done by telephone, and each patient or family member was asked to provide the names and dates of any hospitals, emergency rooms, nursing homes, or rehabilitation hospitals the patient may have utilized in the year previous to enrolling in

HouseCalls as well as during their first year in the program. In cases where the patient had passed away, their families were also asked where and when the death had occurred.

All medical records departments of institutions listed in the medical record or named by the patient or their family as potential facilities the patient may have used were contacted so that specific dates of utilization could be confirmed. Medical records and information provided by family members was used to compile mortality data. All data documenting utilization markers as well as mortality data were entered into a computerized spreadsheet for later statistical analysis.

### Measures

Statistical procedures included taking as the dependent variables, the patient's hospital, Skilled Nursing Facility (SNF)/nursing home, rehabilitation hospital, and emergency room utilization rates; documentation of advance directives; and place of death. The Shapiro-Wilks statistic was used to test whether data met assumptions of normality. Due to the non-parametrical nature of the data, Wilcoxon's matched-pairs signed-ranks test was used to test for significant differences in the utilization rates and documentation of advance directives of patients prior to and after being enrolled in the program. Pearson's chi square was used to test for a relationship between documentation of advance directives and place of death.

## CHAPTER III

### RESULTS

Baseline characteristics of the initial 87 homebound patients enrolled in the program are given in Table 1. 62 of the participants were female (mean age 84.2) and 25 were male (78.0). Whites, non-Hispanics constituted 76% of the patient population, 18% were of African descent, and 6% were Hispanics. Both men and women had some dependence in their activities of daily living (mean ADL score (Katz's Index) = 8.3, mean IADL score = 12.3). Although some patients were non-verbal due to strokes or severe dementia, a substantial number of verbal, less demented patients also showed cognitive impairment (mean Folstein MMSE score = 15.7; CDR = 2.1). Mild to moderate amounts of depressive symptoms were also present in many patients (mean Geriatric Depression Scale score = 10.6). Upon enrollment 53% of the females, and 65% of the males were already receiving skilled nursing in their homes. The majority of the patients were cared for by family members, and most caregivers reported high levels of stress as a result (mean Burden of Care score = 9.3).

Patients received a total of 956 visits from HouseCalls staff. 168 of the visits were made by the geriatrician, and 788 visits were made by geriatric nurse practitioners (GNP's) and family practice residents.



Table 2 shows the average utilization rates per patient per year. The probability of patients having been admitted to rehabilitation facilities in the year prior to joining HouseCalls was 5%, and a similar percentage (4%) also spent time in rehabilitation hospitals after joining the program ( $p = 0.690$ ). Even though the number of days patients stayed in these facilities was less than half after enrollment (0.8 days) in comparison to pre-enrollment (2.2 days), there was a large significance associated with this measure, and the difference did not reach significance ( $p = 0.669$ ). The likelihood of admissions to subacute facilities (13% prior to HouseCalls, 6% while in HouseCalls;  $p = 0.116$ ) and the number of days patients spent there (6.8 days prior, 2.1 once joining;  $p = 0.110$ ) did decrease dramatically after joining the HouseCalls program, although not significantly. The likelihood of being institutionalized in a nursing home prior to joining HouseCalls was 2%, but 19% of HouseCalls patients spent time in nursing homes once they enrolled in HouseCalls ( $p < 0.001$ ).

The HouseCalls program did decrease a number of hospital utilization markers. In the year prior to joining the program, the 87 patients enrolled had a combined total of 77 inpatient hospital admissions, with a mean of 0.89 admissions per person, per year. One year after joining the HouseCalls program the combined total number of inpatient admissions was 42, with a mean of 0.53 admissions per person, per year ( $p = 0.047$ ). Prior to HouseCalls, the mean number of days spent in the hospital was 7.90, but during the first year of receiving HouseCalls, the mean number of days spent in the hospital was

3.87. This is more than a 100% reduction but it only approaches significance, and again there were large variances in measurement ( $p = 0.0687$ ).

Emergency department visits were also significantly decreased once patients joined HouseCalls ( $p = 0.030$ ). In the year prior to HouseCalls patients made a total of 49 emergency department visits, with a mean of 0.56 visits per person, per year, but in the year after patients joined HouseCalls there were only 29 Emergency department visits ( $M = 0.33$ ).

The number of admissions to and lengths of stay at Skilled Nursing Facilities (SNF) was also significantly lower after enrollment in the HouseCalls program. Patients had a 15% probability of being admitted to a SNF prior to joining HouseCalls, and only a 10% probability after joining ( $p = 0.023$ ). The length of time spent in a SNF was also greatly reduced ( $p = 0.018$ ). The mean number of days spent in a SNF by patients prior to HouseCalls was 2.20, compared to a mean of only 0.5 days subsequent to enrollment in the program.

Archival data collected in October of 1997 regarding patients' "previous to HouseCalls" advance directives status as well as their "current" status of advance directives was available for analysis. Among the 25 patients who died during their first year's enrollment in HouseCalls, 4% died in the Emergency Room, 8% in nursing homes, 20% in the hospital, and 68% at home. This means that of the 25 patients who died during the study, 19 died in their place of residence, and 6 died in the hospital. 100% of the patients who died in their place of residence had documented advance

directives. Pearson's chi square analysis demonstrates a significant relationship between documentation of advance directives and place of death ( $p = 0.0087$ ), and this data is given in Table 3. Prior to joining HouseCalls 26% of patients had documented advance directives, and at the time of data collection 74% of patients had documented advance directives ( $p = 0.001$ ). Additional data regarding advance directives can be found in Table 4.



## CHAPTER IV

### DISCUSSION

Baseline characteristics of the patients enrolled in the Baylor Elder HouseCalls Program were comparable to characteristics of other groups of homebound elderly who have been studied. The majority of participants in the current study were elderly females, as were the majority of participants in a Connecticut study of house calls (Fried, et al., 1998), in a Swedish study providing home rehabilitation services (Melin, et al., 1993), and in a randomized study of home health care teams (Zimmer, et al., 1985). Government compiled vital statistics have shown that older women have the greatest burden of disability, and this sample reflects that to be true as well.

The majority of homebound patients in the current study demonstrated significant deficits in providing for their basic needs as well as in additional activities necessary for daily living. Given that these individuals are all considered to be "homebound," this is to be expected. It is likely these deficits have contributed to these dependent patients' current homebound status. Although other studies have demonstrated gender differences in home care needs due to deficits in activities of daily living, no such gender difference was found in the current study (Carriere, et al., 1996). Carriere, et al were examining a broader population of individuals over age 60 who were still dwelling in private

residences. It is possible that when health status has deteriorated to the point that patients are unable to leave their homes anymore, gender differences are no longer a factor.

Although nearly one fifth of the patients were nonverbal due to strokes or severe dementia, even among the verbal population in the study there was moderate cognitive impairment. Levels of cognitive impairment among members in the current study appear to be greater than levels other researchers have found studying similar populations (Fried, et al., 1998; Melin, et al., 1993).

Many patients in the current study also exhibited a number of depressive symptoms. Research has shown that depressive symptoms are more prevalent in the elderly than the general population, with 15-20% of community dwelling and 30% of institutionalized elderly suffering from depression (Callahan, et al., 1994). Some researchers suspect that the actual numbers of depressed elderly patients are much greater, and that depression is not detected in 50% of all depressed elderly patients, even when they see physicians (Sturm & Wells, 1995). One can speculate that if depression is being missed among patients who are seeing physicians, then homebound patients with little access to primary care providers are also suffering from depressive symptoms that are going undiagnosed and untreated. In the current study, mean depression scores indicated that on average this is a moderately depressed group. Of patients who were able to complete the Geriatric Depression Screen (GDS), 81% scored greater than 10, indicating the presence of at least moderate depression. While these homebound patients are suffering from depressive symptoms at a much higher rate than the general

population, given their homebound status, limited functional ability, and limited access to treatment, this is not surprising.

Overall, participants in the study showed significant impairment in functional ability, cognitive status, and emotional stability. Although some of the characteristics of the sample group were similar to the elderly populations studied in a variety of other programs, the patients included in the current study demonstrated greater impairment in areas of functional, cognitive, and emotional status than those previously studied. This suggests that the current population studied was a significantly impaired group upon admission. Although the current study was a historical cohort design, susceptible to selection bias, these participants had numerous deficits. While this may limit the generalizability of results, it is suggestive that there is a noteworthy population of individuals in our society that have demonstrated great need for services targeted at improving their health. Interventions that can be demonstrated to do this may be beneficial to a larger population as well, but at the very least may improve the health status of some of the sickest members of society.

The caregivers of the patients enrolled in the HouseCalls program reported high levels of stress associated with caregiving. Although caregiver burden levels were not measured subsequent to patients being enrolled in HouseCalls, baseline levels of caregiver stress suggest that usual care of homebound patients, where access to care may be limited, is very demanding of patients' caregivers.



It is difficult to draw comparisons between the number of house calls received by patients in the program and national statistics since national estimates of who requires house calls and who is receiving them are not available. While the 1991 Ambulatory Medical Care Survey calculated that the annual mean number of visits made to physician's offices was 6.0 for patients over age 75, patients in HouseCalls received a mean of 11.0 visits from either GNP's, family practice residents, or the geriatrician. Since the homebound patients in the HouseCalls program are dependent in ambulation by definition and likely have more deficits than an ambulatory population, it is not surprising that the HouseCalls patients had higher demands for care.

The differences in the number of admissions and lengths of stay at rehabilitation hospitals was not significantly different prior to or after joining HouseCalls, but this is to be expected. The very way many people become homebound is as a result of some type of serious health condition. For instance, an elderly woman who fell and had to have her hip replaced may have spent months in rehabilitation prior to joining HouseCalls in an attempt to increase her functional ability as much as possible. If she is unable to achieve her pre-morbid level of mobility, she may end up being homebound even after her release from the rehabilitation hospital. Likewise, even after joining HouseCalls some patients were afflicted with injuries or illness that required some amount of inpatient rehabilitation as well, and perhaps in a larger sample a greater difference in the utilization of rehabilitation services might also be demonstrated.

The likelihood of being admitted to a nursing home increased from 2% to 19% subsequent to joining HouseCalls, and that is also to be expected. Since nursing home placements tend to occur at higher rates near the end of life, it makes sense that more patients would experience nursing home admissions during the second year of a cohort study (Kraus, et al, 1976). Slightly fewer nursing home admissions were made among HouseCalls' patients than nursing home admissions in the Johns Hopkins Elder Housecall Program (25%) (Tsuji, Whalen Finucane, and Hisamichi, 1996). When Tsuji and his colleagues researched possible predictors of nursing home placement they discovered that development of strokes or fractures subsequent to joining the program were significantly related to nursing home placements (1996). They suggested that since it is possible to decrease patients' susceptibility to these ailments, that efforts to do so might yield substantial long-term benefits (Tsuji, 1996). Perhaps the diligence of the HouseCalls staff to prevent strokes or fractures led to an lower nursing home admission rate than was measured in the Johns Hopkins program.

As hypothesized, in the year following patients' enrollment in the program their hospital utilizations were decreased. They had significantly fewer hospital admissions than in the year prior to joining the HouseCalls program. A recent study of a home based intervention program aimed at reducing unplanned hospital readmissions also was proved to be beneficial, especially when applied to patients' with a history of frequent unplanned hospital admissions (Stewart et al., 1998). Given the frail, elderly status of these patients, it would be suspected that their health would continue to deteriorate since

increased age puts elderly individuals at greater risk of disability (Gangguli, Fox, Gilby, & Belle, 1996). Given this, we would expect hospital admissions to increase, but in this case the HouseCalls program was actually able to decrease hospital admissions.

Stewart, et al. (1998) stated that previous studies suggest that between 9 and 54% of unplanned hospital readmissions are preventable. They cited research suggesting that such potentially avoidable causes of such readmissions include nonadherence with and/or adverse effects of prescribed medications, inadequate follow-up, suboptimal use of medical care, and early clinical deterioration (Stewart, et al., 1998). It is possible that our comprehensive, interdisciplinary HouseCalls program was able to increase medication adherence, and the HouseCalls staff could more easily monitor patients for adverse effects of prescription medications. This greater access to primary care services in the home may have allowed for closer monitoring, more adequate follow-up care, and earlier diagnosis of clinical deterioration, subsequently decreasing the need for hospital admissions.

The total number of days patients spent in the hospital was also reduced in the year after joining the HouseCalls program. Prior to the HouseCalls program patients, family members, and physicians might have been leery of early hospital discharges because many patients' would have no access to physician or nurse practitioner follow-up care once they left the hospital. Knowing that patients enrolled in HouseCalls would have access to this necessary follow-up care at home may have led to earlier releases from the hospital, resulting in fewer overall days spent in the hospital.



Patients also made significantly fewer visits to the emergency department subsequent to joining HouseCalls. In Zimmer, et al.'s study of a home health care team intervention, they found that on average patients receiving house calls utilized the emergency department more often than patients not receiving HouseCalls, but they concluded that since a small portion of participants in their study had very low numbers of days at risk, that valid conclusions could not be made (1985). The current findings of decreased emergency department utilizations in the current study are more similar to the results of Stewart et al's study on the effects of home-based interventions to reduce unplanned hospital admissions (1998).

Given the nature of the patient population in the current study, it would be reasonable to expect hospital utilization rates to rise in the absence of HouseCalls. So how can the reduction of several hospital utilization markers be explained? Since the HouseCalls program provides easier access to primary health care services to patients in their homes patients did not have to rely on emergency departments to provide treatment for acute, but not life threatening health care needs. The ability of the HouseCalls staff to monitor patients more closely may have allowed them to treat illnesses at their onset as opposed to when situations became emergent. Or perhaps it was the interdisciplinary nature of the "team" of professionals who conducted comprehensive geriatric assessments and provided follow-up care. Stuck, et al concluded, on the basis of his meta-analysis of geriatric assessment programs, that these assessments could reduce the risk of hospital readmission by 12% (1993).



The reduced number of hospital utilization markers was also affected, in part, by the patients who were lost through attrition when they passed away before receiving the benefits of HouseCalls for an entire year. The majority of patients participating in this program are disabled homebound patients' with multiple medical problems, and they are the type of patients that are most at risk for developing a severe health crisis, often need institutionalization, and are at risk for dying (Zimmer, Groth-Juncker, and McCusker, 1985). Given the historical cohort design of the study, and since there is no way to know what arrangements patients or their families would have made had the HouseCalls program not been available to them, it is difficult to measure the true impact of the HouseCalls program. However it is fair to say that an interdisciplinary house calls program was longitudinally able to reduce hospitalization utilization markers for a cohort of frail, homebound, elderly individuals.

The program also had a significant impact on documentation of advance directives and patients' place of death. The number of patients or their proxies who documented advance directives following enrollment in this program was much greater than might be expected. Documentation increased from 26% to 74% subsequent to joining HouseCalls. Other studies have not shown increases this dramatic. Castro, Gloth, and Gloth documented a 23% baseline rate of documented advance directives among patients' older than 65 years, and this is similar to the HouseCalls baseline rate of 26% (1998). A Kaiser Permanente educational campaign to increase the use of advance directives among it's elderly members increased rates from 18.9-21.2% to 32.6-35.0%; a

significant increase, but not as large of a conversion rate as what was documented in the current study (Brown, Beck, Boles, & Barrett, 1999). In a 1994 study of an interdisciplinary intervention aimed at increasing documentation of advance directives of the frail, elderly in an ambulatory practice were more similar to the results of the current study, with 71% of the participants in the 1994 study documenting advance directives (Luptak & Boulton). Luptak, et al. suggested a number of reasons for obtaining such high levels of documentation. Both interdisciplinary approaches allowed for efficient use of individual team members skills. Multiple contacts with patients in the 1994 study as well as in the HouseCalls program allowed patients time to integrate information and make decisions at their own pace. Finally, in both interventions the discussions addressing the issue of advance directives could be tailored to meet the needs of individual patients. All of these potential reasons for increases in advance directives are supported by the results of the current study.

Another interesting finding in regards to advance directives is that while previous research has cited racial differences among the use of advance directives, one year after the HouseCalls program was started, 73% of enrolled patients had documented advance directives, and there were no significant racial differences. This differs from findings in a 1996 study of strategies to promote advance directives in an outpatient setting (Sulmasy, et al). Sulmasy, et al reported that nonwhite race and non-U.S. birth were negatively associated with patient interest in advance directives. Current research does support the findings of a 1998 study of advance directives that suggested that differences

in health care proxy completion rates across various ethnic groups seemed to be related to potentially reversible barriers such as lack of knowledge and perceived irrelevance of advance directives (Morrison, 1998).

The discussion of patients' preferences also appeared to facilitate death at home rather than in the hospital. 100% of patients who died at their place of residence had documented advance directives, and this is strong support for the use of advance directives as a way to facilitate patient preferences while saving the cost of providing extraordinary measures to prolong life (Ratner, 1998).

### Conclusions

The effects of an interdisciplinary house call program were examined on a cohort of homebound elderly individuals. The physical, cognitive, emotional, and functional status of the sample of patients upon enrollment in the HouseCalls program illustrates the need for HouseCalls to address the numerous healthcare needs of frail, elderly, homebound patients. The availability of a physician, nurse practitioner, social worker and other ancillary health care providers to provide comprehensive assessment and primary care in patient's homes provided a much needed treatment option for patients and their caregivers. Families were given a viable option to provide care for patients at home rather than in an institution, and these therapies could be palliative, restorative, or curative in nature, depending on each patients' own wishes. The current study has demonstrated that the HouseCalls program led to decreases in various utilizations of



hospital services. Some researchers have suggested that discharging patients from the hospital earlier than in the past with the intention of using high technology equipment at home may be placing excessive stress on caregivers (Campion, 1995). Interestingly, the number of patients in our program who expressed a desire to care for their loved ones at home rather than at the hospital suggests that for some, home care is the preferred option. The fact that 76% of patients or their proxies documented advance directives indicating they did not want extreme measures taken to prolong their lives also supports the need for increased availability to primary care treatment at home.

The current study suggests the benefits of the Baylor Elder HouseCalls Program were multi-fold. It was suspected that there was a large number of individuals dwelling in the community that were considered to be homebound, and many of these homebound individuals are frail and elderly. Their difficulty accessing care and their impairments seemed to trap many of them into a progressively deteriorating pattern of health. Numerous impairments would often lead to homeboundness, but this homebound status would often prevent them from receiving appropriate and timely care, and their conditions would often worsen, sometimes restricting their independence even further. The HouseCalls program provided easy access to primary health care services from a physician and nurse practitioners that they might not otherwise have received. Delivering much needed health care services to patients who need them would be considered by some, to be worthy in and of itself. When providing comprehensive assessments to patients who were enrolling in the program, often times caregivers would



express how difficult access to care had been for them in the past, and that a program providing primary care services in the home was often exactly what they needed.

In view of the fact that there were decreased numbers of hospital admissions, fewer days spent in the hospital, and fewer visits to the emergency department, it appears that a second demonstrated benefit of the HouseCalls program is that patients in this program experienced an overall stabilization of their health status, and some appear to have actually experienced improved health. Although it may be a stretch to assume that decreased utilizations are necessarily indicative of improved health, the fact that less time was spent in an institution is still a positive outcome.

A third benefit of the HouseCalls program, although not qualitatively measured in the current study, is the high amount of satisfaction patients and caregivers anecdotally report in regards to the program. During data collection numerous patients and caregivers verbally reported their satisfaction and appreciation of the provision of HouseCalls. Many patients have sent written acknowledgments of their gratitude to the HouseCalls staff, and some philanthropic enrollees have donated generously as a token of their appreciation for services provided to them or their families through the HouseCalls program.

A fourth benefit was that the health care and end-of-life wishes of many of our patients or their proxies were able to be honored, likely due to the fact that documentation of advance directives increased so dramatically once patients had been enrolled in the program. Patients who wished to exit from this world with dignity in the

peace and serenity of their own homes, surrounded by their loved ones were able to do this, and patients' who were seeking aggressive treatment until the end also had their wishes honored. All patients and caregivers were afforded the opportunity to discuss these issues with the HouseCalls staff.

As an added benefit, but certainly not as the primary benefit, since this program decreased a number of utilization markers, a reasonable conclusion would be that this program can help to decrease hospital costs as well. Further research to determine the actual cost-benefit ratio and subsequent cost-effectiveness of such an intervention is still necessary.

### Limitations

Due to the historical cohort design of the current study, there are methodological issues that should be noted. As explained earlier, it was difficult to decide on the most appropriate way to handle attrition due to death of subjects. Since this was not a randomized study, there was no control group available for comparison. Given the fact that health status generally declines with age, using a within subjects design makes comparisons more difficult than when a control group is readily available. The use of multiple comparisons may increase familywise error, and this was not accounted for in the current study. When collecting data regarding patients' health care utilizations, the researcher had to rely primarily on patients' or families' self-reports. Utilizations patients had prior to joining HouseCalls that were not reported to investigators would

have led to an under-reporting of utilizations which would suggest the true impact of HouseCalls is actually greater than what the statistics indicate. The archival data collected in regards to advance directives was incomplete, and inferred conclusions may not be accurate.

### Future Research

With recent changes in Medicare reimbursement schedules, it is extremely important that the efficacy of house calls continues to be measured. While it is important to continue to measure utilization rates as a measure of effectiveness, additional quantitative measures of patient and caregiver satisfaction, quality of life, and improved functional ability should also be studied.

Cost-effectiveness analyses of house call programs should also be studied. The ideal intervention would decrease health care utilizations, while improving patients' health, all at a net cost savings.

While it is interesting to evaluate a comprehensively designed program, it would be helpful to identify which parts of the intervention contribute the most to improved outcomes. It would be useful to know whether a single aspect of the program is primarily responsible for the beneficial results of the program, or whether the benefits are realized through the interaction of multiple facets of the program.

Finally, to most effectively evaluate the benefits of a program such as the Baylor Elder HouseCalls Program, a randomized design is necessary. While a descriptive or

historical cohort design may provide rich information, to better identify the efficacy of such a program a randomized study with an appropriate control group is needed. This will allow for unbiased comparisons to be made between usual health care and the services provided through innovative house call programs.



## APPENDIX

**Table 1. Patient Characteristics**

	<b>Mean <math>\pm</math> SD</b>	<b>%</b>
<hr/>		
<b>Age by Sex</b>		
Male (n = 25)	78.0 $\pm$ 8.6	...
Female (n = 62)	84.2 $\pm$ 9.6	...
<b>Race</b>		
White, non-Hispanic	...	76
African descent	...	18
Hispanic	...	6
<b>ADL (Katz's Index)</b>	8.3 $\pm$ 3.5	...
<b>IADL</b>	12.3 $\pm$ 2.7	...
<b>Folstein's MMSE (mental status)</b>	15.7 $\pm$ 9.7	...
<b>Clinical Dementia Rating (CDR)</b>	2.1 $\pm$ 1.7	...
<b>Geriatric Depression Scale (GDS)</b>	10.6 $\pm$ 7.6	...
<b>Receiving skilled nursing</b>		
Females	...	53
Males	...	65
<b>Burden of Care</b>	9.3 $\pm$ 5.1	

**Table 2. Utilization Markers**

	<u>Pre-Enrollment</u>		<u>Post-Enrollment</u>		p
	Mean $\pm$ SD	%	Mean $\pm$ SD	%	
<b>Hospital admits</b>	0.89 $\pm$ 1.2	...	0.53 $\pm$ 0.8	...	0.047
<b>Hospital days</b>	7.90 $\pm$ 16.3	...	3.87 $\pm$ 6.7	...	0.069
<b>Emergency Dept visits</b>	0.56 $\pm$ 0.9	...	0.33 $\pm$ 0.7	...	0.030
<b>Nursing Home admits</b> 0.001		...	2	...	19
<b>Rehabilitation admits</b>	...	5	...	4	0.690
<b>Rehabilitation days</b>	2.2 $\pm$ 12.5	...	0.8 $\pm$ 4.4	...	0.669
<b>Sub-acute admits</b>	...	13	...	6	0.116
<b>Sub-acute days</b>	6.8 $\pm$ 22.6	...	2.1 $\pm$ 10	...	0.110
<b>SNF admits</b>	...	15	...	10	0.023
<b>SNF days</b>	2.2 $\pm$ 6.3	...	0.5 $\pm$ 3.3	...	0.018

**Table 3. Place of Death in Relation to Advance Directive Status**

		<b>Advance Directive Status at Time of Death</b>		
		<b><u>No</u></b>	<b><u>Yes</u></b>	<b><u>Total</u></b>
<b>Place of Death</b>	<b><u>Residence</u></b>	0	19	19
	<b><u>Hospital</u></b>	2	4	6
	<b><u>Total</u></b>	2	23	25

Pearson's Chi Square statistical significance of differences:  $p = 0.009$



**Table 4. Racial/Ethnic Differences in Documentation of Advance Directives (AD) after Enrollment in the HouseCalls Program**

	<b><u>African Descent</u></b>	<b><u>White, non-Hispanic</u></b>	<b><u>Hispanic</u></b>	<b><u>Total</u></b>
AD before enrollment	1 6 %	21 32 %	3 60 %	25
AD after enrollment	10 62 %	28 43 %	0 0 %	38
No AD after enrollment	5 31 %	16 24 %	2 40 %	23

Pearson's Chi Square statistical significance of differences:  $p = 0.069$

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