OUTCOMES EVALUATION OF SUPPORT AND TIMELY ATTENTION FOR YOU

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Background: Older adults prefer to maintain an independent lifestyle even though there are physical, psychological, and social factors that sometimes affect their ability to maintain this style of living. Support and Timely Attention for You (STAY) is an aging in place program that helps older adults remain independent and delays their movement to higher levels of care such as those offered in assisted living or skilled nursing facilities. To determine whether STAY increased the number of days in independent living and decreased the number of hospital admissions, an outcomes evaluation was conducted.

Methods: Independent living residents were divided into two groups, those receiving STAY services, (STAY), and those not receiving STAY services (nSTAY). The number of falls, hospital admissions, number of days in independent living, and scores from the Senior LIFEsteps assessment were analyzed before and after the program began.

Results: A number of findings suggested STAY was having a positive impact. For example, return to independent living (IL) following a hospital admission increased. Nearly 70% of hospital admissions in 2010 involved a STAY resident, and of these, 72.7% of the residents were able to return to IL. The percentage of STAY residents admitted to the hospital decreased from 44.7 % in 2009 to 33% in 2010. Interpretation of the Senior LIFEsteps data indicates the health status of STAY residents did not decline over the years. The majority of falls and illnesses involved STAY residents.

Conclusions: The STAY program provides a high quality of care to the residents. Due to the difficulties in obtaining a control group, it was impossible to determine whether the STAY program increases the number of days in independent living. However, there appears to be a number of positive findings relative to program impact. A stronger design would be needed to demonstrate these outcomes are due to STAY.

Public Health Significance: The STAY program provides a unique way for older adults to maximize their quality of life as they age in place. This type of program has the potential to decrease healthcare cost by reducing hospital admissions caused by medication non-adherence, falls, and illnesses.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

This evaluation and thesis writing process has energized me about a future career in public health. It has also reinforced for me that public health is my true career passion and plays on my strengths and skills. I am eager to begin a career focused on improving the quality of life for others.

1.0 INTRODUCTION AND BACKGROUND

This section describes the growing number of elderly in the United States and the changes they experience as they age. Support and Timely Attention for You, a program at Asbury Heights in southwestern Pennsylvania, was designed to help independent living residents maintain an independent lifestyle, is also introduced.

1.1 EPIDEMIOLOGY OF THE ELDERLY AND THE ELDERLY IN NURSING HOMES

Between 1999 and 2009, the number of Americans aged 65 and older increased by 12.5% from 35.3 to 39.6 million.[1] It is predicted that the number of people aged 65 and older will increase from 40 million in 2010 to 55 million by 2020, and this number is expected to reach 72.1 million by 2030 (Figure 1.1). According to the National Nursing Home Survey from 2004, approximately 1.5 million people live in nursing homes and over 900,000 older adults live in assisted living.[2, 3]
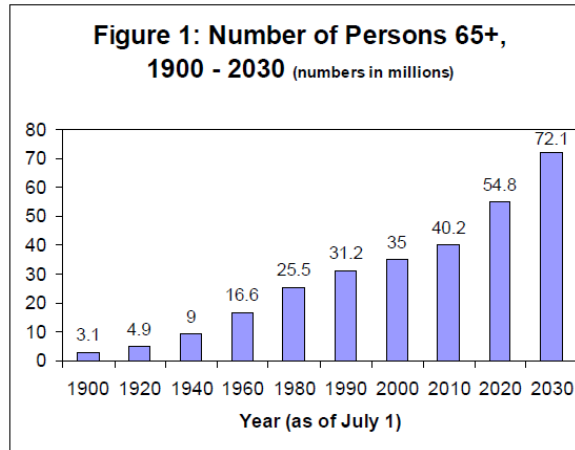
Figure 1.1 Change in Number of Elderly, 1900-2030

1.2   CHANGES THAT OCCUR IN THE ELDERLY

Older adults prefer to maintain their independence and autonomy as they age by remaining in their homes and communities. Despite this, a number of physical, psychological, and social events changes prevent older adults from maintaining their preferred style of living. As the human body ages, it deteriorates and chronic diseases such as cardiovascular disease, diabetes, cancer, osteoporosis, and dementia may develop. For example, decreases in immune system function decrease the ability of the body to fight infection.[4] Osteoporosis along with problems with vision, balance, and decreased strength, put the elderly at high-risk for falls. According to the Centers for Disease Control and Prevention (CDC), 80% of older people have at least one chronic disease and 50% have two or more.[5]

An essential component of chronic disease management is medication adherence. Often times, management of these chronic diseases consists of patient monitoring and complex medication regimens. The ability to remember the correct dosage and frequency of medications,

which oftentimes are similar in size, shape, and color, is difficult for someone with poor vision and memory loss.

Chronic conditions also lead to a loss of memory and arthritis that often make it difficult to manage activities of daily living (ADL's) such as bathing, dressing, and ambulation as well as instrumental activities of daily living (IADL's) such as cooking, cleaning, and managing money.[6] These changes in physical and mental health often make it difficult for older adults to continue their independent way of life.

The term "independence" and "independent living" has been interpreted a number of ways in the literature, several of which are described by Plath.[7] However, for the purpose of this thesis, the definition of "independent living" is the ability to execute basic ADL's and IADL's.[8] People do not realize the importance of independence until 1) They completely lose that independence or 2) A situation that temporarily threatens their independence occurs. Medical conditions among the elderly decrease one's ability to live the independent lifestyle they had when they were younger.

All of these changes have psychological effects as well. Oftentimes, older adults who are not as active as they once were become depressed[9]. A circular pattern of loss of function/independence and feelings of depression ultimately has a negative impact on the quality of life for older adults. Poor medication adherence is yet another obstacle to breaking this vicious cycle of depression.[10]

The emotions seniors feel about the loss of independence, moving into a nursing home, and aging in place have been investigated in several research studies. Biedenharn et al. found that fear of entering a nursing home was a source of chronic anxiety among the elderly.[11] In a study conducted by Mattimore et al, hospitalized patients with an average age of 61.8 ± 14.6

years were asked the following question, "Would you be very willing, somewhat willing, somewhat unwilling, very unwilling, or would you rather die, than put up with living in a nursing home all the time?"[12] Thirty percent of respondents said they would "rather die," 26% would be "very unwilling," and only 7% would be very willing.[12] In a study commissioned by the Clarity® and the EAR Foundation of 402 people aged 65 years and older, 26% identified loss of independence and 13% rated moving into a nursing home as their greatest fears.[13] In contrast, death was the greatest fear among only 3% of people. In the same study, 89% of older adults indicated the ability to age in place was very important to them, yet 53% were concerned with their ability to do so.

In addition to the fear of being admitted to a nursing home, moving an older adult to a new setting contributes to confusion, feelings of loss of independence, and depression.[14] Transition to a nursing home often results in physical and mental decline as well as premature death.[15] It is not uncommon for older adults living in assisted living or senior housing to fear being forced to a higher level of care[16, 17].

Since family members and their loved ones are forced to make difficult decisions about long-term care there has been increasing public demand from seniors and their families to develop innovative solutions that allow them to keep the independent way of life they have known for so long[12, 18].   Given fears among the elderly and the demand for innovative living options that allow older adults to remain independent for as long as possible, researchers and nursing home administrators have been forced to rethink the traditional nursing home model of care.   This type of rethinking at a local senior living community, Asbury Heights, resulted in the creation of a program called Support and Timely Attention for You.

1.3   PROBLEM STATEMENT

An increasing demand from elderly and their family members has forced nursing homes and other senior housing options to develop innovative ways to help residents maintain an independent lifestyle for as long as possible.

1.4   STAY PROGRAM DESCRIPTION

Support and Timely Attention for You (STAY) is a program that is available to independent living residents at Asbury Heights (AH), a senior living community located in the South Hills of Pittsburgh, which offers living accommodations and healthcare services for independent living, assisted living, nursing and rehabilitative care, as well as Alzheimer's care. The goal of the STAY program is to help independent living residents maintain their ability to live independently. Nurses provide a variety of medical services such as filling medication boxes, medication administration, wound care, injections, and vital signs.

1.5   PURPOSE OF EVALUATION

To evaluate whether the STAY program increases number of days spent in IL and decreases hospital admissions related to falls and illnesses.

1.6   HYPOTHESES

The proposed thesis will examine the following hypotheses:

1) The STAY program increases the number of days residents can "live independently" before needing assisted living or skilled nursing care.

2) The STAY program is associated with a decrease in the number of hospital admissions and transfers related to falls and acute/chronic illnesses among Independent Living residents at Asbury Heights.

The proposed thesis will answer some additional questions:

1) Is marital status associated with a resident's participation in STAY?

2) What kinds of outcomes have been achieved by other Aging in Place programs?

3) How do the findings of the STAY program evaluation compare with those of other aging in place programs?

2.0   LITERATURE REVIEW

A search of the literature for "aging in place," and "aging in place and elderly," was conducted using PubMed and Scopus.   Other keywords included: "nurse facilitated medication management," "outcome assessment (health care)," and "program evaluation." Since medication adherence is an important component of aging in place, it was searched as well. Although a number of aging in place programs were found in the literature, Tigerplace is most similar to STAY in terms of the population served and the services offered. Since medication adherence is a problem among the older adults, medication administration was among the most common programs mentioned in the literature.

2.1   AGING IN PLACE OPTIONS FOR THE ELDERLY

Aging in Place (AIP) means, "growing older without having to move."[19] The term is used in two different contexts in the literature depending upon whether the person relocates before aging in place. Seniorresource.com, a reputable internet resource that contains extensive information about housing and other services for seniors and their caregivers, defines AIP as "living where you have lived for many years, or living in a non-healthcare environment, and using products, services and conveniences to enable you to not have to move as circumstances change."[19] Originally, this term referred to helping the elderly remain independent in their own home

through support services such as home remodeling. More recently, however, aging in place can also refer to relocating to a new community and staying there for as long as possible.

With the AIP model, ideally, the home environment supports independence, and healthcare is coordinated through a team of providers.[14]   Functional and cognitive assessments are performed to determine the individuals' strengths, limitations, abilities, and types of support needed to live independently. Care is provided to the older adult and modified as his/her health care needs change.[14]

There are several options for AIP: private, age-restricted gated retirement communities, naturally occurring retirement communities (NORC), continuing care retirement communities (CCRC), and Programs of All-Inclusive Care for the Elderly (PACE).[20, 21]   Private age restricted communities attract residents with a higher socioeconomic status and have recreational activities, clubhouses, restaurants, and a number of other amenities.[20]   A NORC is a community for older adults that evolves over time as the result of changing demographics. An example of a NORC is an apartment building in which the demographics of the tenants change over time so that the average age is 60 years-old. Since a NORC contains a number of older adults who living close to one another, it is more cost effective for social service agencies to provide support including: crisis intervention, fall prevention, case management, education, and recreational activities.   A Congressional Service Report from 2007 suggests that NORC's decrease depression and help older adults stay in their homes longer.[22]

CCRC's and PACE program are two other options for AIP. A CCRC features a continuum of care where an individual will typically move from independent living to assisted living, and then to skilled nursing over time. CCRC's are expensive but guarantee to provide

continuing long-term care.[22] PACE programs utilize an integrated, interdisciplinary approach to help chronically ill older adults remain in their homes as long as possible.[21]

2.2   REVIEW OF AGING IN PLACE PROGRAMS

The following AIP programs were identified in the literature: 1) Tiger place, 2) Gatekeeper Program, and 3) PACE. Of these programs, the one most similar to the STAY program was Tigerplace, a senior living community that was started through a public-private partnership between the University of Missouri Sinclair School of Nursing (SSON) and the Americare corporation.[23] Tigerplace has "Services designed to help seniors age in place, stay active and healthy, and in the future for most, avoid the need to move to a nursing home."[23] Special legislation was required which enabled a payment mechanism for nurse care coordination.[23, 24]

The AIP program at Tigerplace offers assistance with the following: 1) ADL's like bathing, dressing, weekly cleaning and laundry, and shopping, 2) Medication administration, eye drops, or inhalers, 3) Social services like bill payment, completion of forms, and counseling, 4) Exercise program and recreational activities, 5) Skilled nursing services including, education and monitoring of medications, nutrition, safety, disease, delivery of wound care and catheter care, communication with healthcare providers, and 6) Physical, occupational, and speech therapies.[14]

Tigerplace consists of 64 apartments and offers onsite amenities such as meeting rooms, a beauty shop, sports bar, library, a veterinary clinic, and an exercise and spa area.[23] The strengths, limitations, and functional and cognitive capabilities of each resident are assessed in

order to tailor the support services to each resident's needs. The staff at Tigerplace offer care coordination with physicians and other healthcare providers as well as help with ADL's, medication administration, social services, and wound care.[14]

To assess the clinical outcomes of this program, Marek et al. matched 78 AIP residents to 78 nursing home residents based on the age, cognitive function, ADL's, and enrollment/admission date.[25] The following conditions were assessed in both groups: cognition, depression, incontinence, functional status, and pressure ulcers. Cognition, depression, ADL, and incontinence improved at a statistically significant level for the AIP group compared to the nursing home individuals.[25]

In addition to the improved clinical outcomes of AIP programs, a recent article by Rantz et al. shows the cost effectiveness of AIP compared to nursing home costs.[26] In this study, cost, physical and mental assessment findings were compared at two separate long-term care settings. Tigerplace was the first AIP setting, and it provided care through the end of life. Maplewood, the second setting, was a traditional CCRC, and residents remained independent for as long as possible before moving to higher levels of care. The study found that the total cost for care and housing for any resident who received services beyond the AIP base services and who qualified for nursing home care never equaled or surpassed the national average cost of nursing care at either location.[26]

Another program, The Gatekeeper Program, although less notable in the literature, focuses on preventing premature nursing home admissions through a unique community and hospital partnership.[27] Southwest General Hospital, which is located in the southwest suburbs of Cleveland, serves six surrounding communities. The Gatekeeper Program, which began in 1994, utilizes specially trained volunteers known as Gatekeeper volunteers to identify at-risk

older adults within the community. The volunteer training lasts 1-2 hours and trains individuals to identify signs and symptoms (newspapers piling up outside the home, use of numerous medications, memory loss, and confusion among others). The volunteers have a wide range of backgrounds: bank tellers, pharmacists, utility meter readers, and Meals-on-Wheels workers.

In the Gatekeeper Program, referrals were reviewed by a nurse and social worker who determined the appropriate next steps. Most of the time, the older adult receives an unannounced visit by the nurse and social worker. Ninety-five percent of the time, the older adults are open to being helped. After the physical and psychosocial health needs of the older person are evaluated, a plan for connecting the resident to community resources is jointly developed at no cost the older adult. This program found a statistically significant decrease in the number of emergency room visits and hospital admissions. A cost effectiveness analysis found that for every one dollar spent in nursing home care, the Gatekeeper Program saved $39.[27]

Yet another model for AIP is PACE programs, a community-based care model that provides comprehensive care to older adults who are frail, chronically ill, and have substantial cognitive and functional deficits.[21] PACE Programs are comprehensive community-based care models for frail, chronically ill older adults whose significant functional and cognitive impairments make them nursing home eligible. The first PACE program began in 1971 in San Francisco's Chinatown by Marie-Louise Ansak. Medical and social services are coordinated by a team of professionals including physicians, nutritionists, social workers, nurse practitioners, therapists, and transportation workers.[21]   The program provides transportation of the participants to a Day Health Center where they receive health and social services. The name of the Pittsburgh-area PACE Program is LIFE (Living Independence For The Elderly) Pittsburgh.[28]

Funding for PACE programs comes from capitated payments from Medicare and Medicaid.[21] PACE pays for all healthcare needs of the participants including physician visits, prescription drugs, transportation to and from the PACE center, and hospitalizations. If an enrollee, requires skilled care at a nursing home, the PACE provider is financially responsible. PACE participants may have to switch healthcare providers if their current physician is not a contracted PACE provider.[21] PACE programs are effective and have demonstrated the following outcomes: fewer hospitalizations, increased number of days in the community, and better functional status.[29, 30]

STAY is similar to PACE programs; however, they are different in several ways. The first way is in terms of eligibility. To be eligible for PACE, enrollees must be certified as eligible for nursing home level of care in the state where they reside, whereas IL residents at Asbury Heights, both STAY and nSTAY, are by definition not eligible for nursing home level of care.[21] Both programs help older adults remain independent and receive care customized to their level of need. Similar to transportation services offered by PACE programs, Asbury Heights offers transportation services to the grocery store and other locations. Unlike PACE programs, residents in the STAY program do not have to switch physicians. Since STAY residents are covered under their existing insurance plan, the program does not cover hospitalizations and physician visits like a PACE program.

2.3   MEDICATION ADHERENCE

Many studies have focused on medication adherence among older adults. Medication adherence refers to the degree with which a person's behavior regarding medication administration matches

with advice received from a healthcare provider.[31] Specifically, it involves 1) Ordering and buying the prescribed medications, 2) Taking what is prescribed, 3) Taking it at the appropriate time, and 4) Taking the prescribed dosage. Medication adherence is a problem among the elderly that often leads to unnecessary hospital admissions.[32] Col et al found that 11% of hospital admissions among patients 65 years and older were due to medication non-adherence.[33] A study conducted in Australia showed that medication non-adherence accounted for 26% of hospitalizations among those 75 years-old and older.[34]

According to MacLaughlin et al, the reasons for medication non-adherence, although numerous, fall into one of the following categories: demographic, medical, medication, behavioral, and economic.[31] Functional health literacy, that is the ability to read, comprehend, and act on health information, contributes to medication adherence. Medical factors such as poor vision and manual dexterity also make it harder for an older adult to take prescribed medication, regardless of their degree of health literacy. Two studies, one conducted by Claxton et al and the other by Eisen et al, found the frequency of medication administration as well as complex medication regimens had a negative effect on adherence.[31, 35, 36] Behavioral and economic factors such as cost and inadequate instruction were found to be the first and second most likely reasons for hospital admissions due to non-adherence according to Malhotra et al.[37]

Although the reasons for medication non-adherence may be intentional or unintentional, it still has a number of negative effects. Non-adherence not only contributes to disease progression, but it has a financial impact on society as well.[32] Balkrishnan et al found that a 10% increase in the medicine possession ratio, days of prescription divided by number of days between prescription refills x 100, was associated with a 5.6% decrease in costs.[38]

Other negative effects of medication non-adherence are financially related. Medications that are purchased but not used are wasted. A study of 73 people from a retirement community in New Hampshire found that 2.3% of the medications were wasted with a mean individual annual cost of $30.47.[39] Based on this information, the estimated national cost of wasted medications for adults 65 years and older is over $1 billion per year.[39]

A variety of approaches for improving medication adherence is discussed in the literature. These approaches range from education programs, telephonic interventions, and community pharmacists to technological and other reminder systems.[31, 32, 40, 41] Education programs have had mixed effects on medication adherence.[32] For example, telephonic interventions by nurses or pharmacists have improved adherence in some studies.[42, 43] In a recent review, Doggrell et al. found that interventions delivered by allied health professionals such as nurses and pharmacists have had some benefit.[32] Although it is assumed that interventions by allied health professionals would improve medication adherence, the authors conclude that many questions remain and further study is necessary.

Although a few studies have used face-to-face counseling during a home visit, few studies have an intervention like the STAY program in which nurses provide daily or weekly support with medication administration. Since medication non-adherence is associated with hospital admissions, an intervention such as STAY, which provides medication administration support, may decrease hospital admissions.

3.0   STAY PROGRAM AND HISTORY

The STAY program, which began in November 2008, provided new and alternative options beyond those available in the IL setting. It was created in response to demand from family members and IL residents who wished to be able to remain in their current residence even when in need of assistance. Prior to the STAY program, IL residents were transferred to assisted living if they needed help with medications but were otherwise independent. As a result, people were being transferred to higher levels of care, which made them leave their familiar surroundings and give up their independent way of life. However, with the STAY program, people can stay in their current living situation and receive the medical assistance needed to remain independent.

The STAY program is available to any resident in independent living. Residents may self-enroll in the program; however, more often the nursing staff identifies residents who would benefit from the program. Residents may enter the program at the time of admission to Asbury Heights, while they are in independent living, or upon their return to Asbury Heights after a hospital admission. The length of time that a resident receives STAY services varies. Some residents have been enrolled in the program since its inception, while others go on and off as needed depending on their health condition. Residents that return to independent living following a hospital admission are often placed on the program. The availability of medical personnel can ease their transition back to their apartment, and help prevent a 30-day hospital

readmission.   Residents do not pay a fee in order to participate in the program; however, there is a modest charge for residents who receive more than two visits per day by a STAY nurse.

The STAY nurses have a number of patient related and administrative responsibilities. The STAY nurse makes rounds twice a day, and carries a small bag with basic medical equipment. Some ambulatory residents will see the STAY nurse in the STAY office instead of their apartment for daily medication or treatment.   In addition to patient related duties, the STAY nurse assists with appointment scheduling and communicates with primary care physicians about the residents' health.

Each resident visit with a nurse is called a STAY contact. The list of services and treatments provided by the program are listed in Table 3.1.

Table 3.1 STAY Program Services and Treatments

Type of Service or Treatment
Weekly medication administration
Daily medication administration
Blood pressure
Orthostatic blood pressure
Blood glucose level
Injections
Refill oxygen tank
Check oxygen tubing
Weight
Vital signs
Pulse oximetry
Wound treatments
Senior LifeSTEPS Evaluation
Tuberculosis test

Residents who receive weekly medication administration are given pre-filled pillboxes on Sunday mornings. If a resident is not able to manage his/her medications on a daily basis, the

STAY nurse will bring the correct dose and medication to the resident (daily medication administration). Both of these services increase medication adherence and reduce the potential for a medication error or overdose by the resident.

The STAY nurses, are well liked among the residents, and develop personal bonds with them. The dynamic that exists between residents and the STAY nurses benefits the residents in a number of ways. The nurses are a means of social interaction for the residents, and it is well known that lack of social contact can lead to poorer health outcomes.[44, 45] The social interaction is not only psychologically beneficial, but also may decrease the risk of hospital readmission. Since the resident can be evaluated daily, the nurse can identify a condition before it becomes too severe. Likewise, the presence of medically trained personnel may identify and head off health crises before they develop.

The STAY program is fully funded through the generally operating budget with the exception of a $1000 dollar gift from a resident. Currently, the program does not receive any form of external support such as Medicaid or Medicare. Asbury Heights is applying for grants with the intention to expand the program.

4.0   METHODS

This section describes the two ways in which outcome measures were compared. A before/after design was used to quantify the effect the program had on certain outcome measures.   In addition, outcomes were used to characterize the differences between STAY and nSTAY residents.

4.1   PARTICIPANTS

The sample frame for this evaluation included 254 residents at Asbury Heights living in Independent Living (IL) between 2007 and 2010. From this sample frame, 20 people were excluded since their date of birth and/or original date of admission were not available. Eighteen of the people were deceased prior to the start of the STAY program.   Because rich data regarding falls and hospital admission was available for these 20 residents, the falls and admissions data for them was included in the evaluation.

Not all of the participants lived in IL for the same length of time. This duration was affected by changes in health status that would require a resident to be admitted to the hospital and/or transferred to a higher level of care such as Assisted Living (AL) or Skilled Nursing (SN). In addition, the length of time spent in IL was a function of the resident's admission date.   For

example, a current resident who was admitted in 2007 had more days spent in IL than a current resident who was admitted in 2009.

4.2   EVALUATION DESIGN

In order to design the evaluation, input from key stakeholders at Asbury Heights was important. I developed an in-depth understanding of the program, its background, and intended outcomes by reviewing written documentation about the program and interviewing the administration at Asbury Heights as well as the STAY program nursing staff. Conversations with Stacey Mikelonis, the Administrative Director, and Marcy Bryers, Director of Health Services, provided a background of the program. During these conversations, I formulated evaluation goals by asking them what questions they wanted the evaluation to answer. This approach helped me focus the evaluation to best meet the needs of the stakeholders. Written information from a grant application and the STAY program brochure enhanced my understanding of the program. I observed the program in action by shadowing the STAY nurses as they visited the residents. The combination of interviews, questioning, and observation provided a rich understanding of the program.

With an understanding of the program, the desired outcomes, and the evaluation questions, I developed a logic model to plan the evaluation (Appendix A). Along with the logic model, a set of specific evaluation questions were identified for the outputs and outcomes. Key quantitative indicators are listed for each evaluation question in Appendix A.

The evaluation used a before/after study design to determine whether there was an association between the STAY program and the ability for residents to remain in IL longer. The

number of days that residents spent in IL prior to either 1) A permanent transfer to a higher level of care or 2) Death as an IL resident was compared to statistics prior to the program. Hospital admissions and transports to the emergency room in 2007-2008, prior to the STAY program, were compared to those in 2009-2010 after implementation of the STAY program. Likewise, the number of falls and acute/chronic illnesses before the program were compared to those that occurred since it started.

4.3   METHODS OF MEASUREMENT

There were two steps to the data collection process: 1) STAY program data collection and 2) Design of the STAY program database. Raw data collection was completed through the combined efforts of the STAY nurses and the Director of the Health Services. After the data collection process began, I created a Microsoft Access database to provide a centralized location for all of the data.

4.3.1   STAY Program Data Collection Process

The Asbury Heights staff collected data associated with 1) STAY contacts, 2) Falls and hospital transfers, and 3) Senior LifeSTEPS assessments.

4.3.1.1 STAY Contacts

STAY nurses recorded assessment findings for each patient contact in a small spiral-bound notebook. Upon return to the STAY office, this information was transferred to the patient's

Treatment Admission Record Sheet (TARS) and/or Medication Administration Record Sheet (MARS), standard documentation forms used by nursing homes. At the end of each month, Marcy Bryers used the MARS and TARS to manually tally each type of STAY contact for each resident. This data was then entered into a Microsoft Excel spreadsheet. The spreadsheet tracked patient name, type of service (weekly medication administration, blood pressure, etc.), number of times per period (week, day, month), number of periods, and the total count. For example, if a patient's blood pressure was checked twice a day for twenty days, the number of periods was 20 days, and the number of times per period was two. The resident would have received 40 STAY contacts for the given month.

4.3.1.2 Falls and Hospital Transfers

Falls and hospital transfers were each tracked in separate spreadsheets. For each fall, the resident's name, and date, time, and location of the fall were collected (when available.) A column labeled "Follow-Up" described injuries sustained by the residents and whether the patient required transport to the hospital. The Hospital Transfers spreadsheet recorded the name, date of transfer, time (when available), type of illness (acute or chronic), the reason for the transport, and the level of care upon return to Asbury Heights.

4.3.1.3 Senior LifeSTEPS

Asbury Heights uses Senior LIFEsteps, a validated screening tool developed by Health Resources Alliance, for measuring the health and overall level of independence of seniors. It is used to assess the needs of elderly and create a personal care plan that maximizes a resident's dignity and independence.[6] This tool is used to help place a resident in IL, Al, or SN upon admission to Asbury Heights.

The Senior LIFEsteps consists of the following assessments: 1) The Perlin Assessment Tool for Fall Risk, 2) Timed "Up and Go" Test (TUG), 3) Mini-Mental State Exam (MMSE), 4) Drug Regimen Unassisted Grading Scale (DRUGS), 5) Geriatric Depression Scale (GDS), 6) Instrumental Activities of Daily Living (IADL), 7) The Lawton Physical Self-Maintenance Scale (PSMS), and 7) the Wassenaar Continuum Scale (WCS).[6] The Perlin Assessment Tool for Fall Risk assesses balance and gait.[6] TUG evaluates mobility and balance by having the resident get up from a chair, walk 10 feet, turn around, and then sit back down again.[6] MMSE assesses cognitive mental status and is one of the most commonly used tools for measuring cognitive functioning.[6] DRUGS tell a healthcare provider whether an individual needs help with medication management as well as the type of help needed. The GDS is helpful for identifying depressive symptoms. The IADL measures a resident's ability to do complex tasks such as shopping, cooking, using the phone, and doing housework and laundry, whereas the PSMS assesses activities of daily living such as dressing, grooming, bathing, feeding, ambulation, and continence.

The sub scores from each test are then combined on the WCS to provide an overall numeric value that represents a resident's level of independence and well-being. The WCS assesses both the physical and psychological needs for older adults (Table 4.1). For the purposes of this evaluation, data for the following tests were readily available for analysis: Perlin Assessment Tool for Fall Risk, TUG, MMSE, and WCS.

Table 4.1 Parts of Wassenaar Continuum Scale

Part I Physical Needs	Part II Psychological Needs
Physical Health Medication IADL's ADL's Continence	Memory Behavior

Scores obtained before the STAY program in 2007 and 2008 were compared to ones obtained after program implementation. In 2010, the nursing staff began assessing all IL residents on an annual basis. Paired t-tests evaluated changes in scores on the Senior LIFEsteps assessment over a two-year period before and after the start of the STAY program for both groups of residents.

4.3.2   STAY Program Database Design

In order to combine the multiple sources of data, a database using Microsoft Access was built. Appendix A displays the underlying structure of the database and the one-to-many relationships between the tables. The database can be divided into four sections: 1) Residents, 2) STAY contacts, 3) Incidents and Dispositions, and 4) Senior LifeSTEPS. The Residents table tracked basic demographic data, medical record (MR) number, medical history, alcohol and tobacco use, status within the STAY program, and current level of care. The STAY contacts section collected data associated with each STAY contact.

The Incidents and Dispositions section contained data related to patient falls and hospital transports. The term "incident" was used to define events with a negative or potentially negative outcome such as a fall or illness, and three types of dispositions were recorded for each incident: incident, transport, and admission. Incident disposition indicated whether the incident resulted in transport to the hospital. Every fall or illness did not necessarily require transport to the emergency room. Of those residents who were taken to the hospital, a transport disposition was assigned. Oftentimes, a resident's condition could be managed in the emergency room, and the resident was able to return to AH the same day. Therefore, three options were used to code transport disposition: 1) Admission to the hospital, 2) Taken back to AH, or 3) Incomplete data. Admission dispositions, which were only recorded for people who were admitted to the hospital, described where the resident was transferred to upon discharge from the hospital. The admission disposition codes used were as follows: 1) Returned to IL, 2) Returned to AL, 3) Returned to SN, 4) Transferred to another facility, 5) Remained in the hospital, or 6) Died.

The fourth section of the database tracked Senior LifeSTEPS data. This section was set to collect data for the following assessments: balance, gait, TUG, MMSE, and the WCS. Since the date of the assessment and the resident's MR number were also tracked, it was possible to compare assessment findings for the same resident at different points in time.

4.4   CALCULATIONS

Utilization of the STAY program was based upon the number of months a resident used the program during 2010. Utilization was defined as at least one STAY contact during a given month. A database query listed the number of months each resident received STAY services.

Residents were placed in one of four utilization categories, 1-3 months, 4-6 months, 7-9 months, and 10-12 months.

The number of days spent in IL was calculated for all residents with the exception of 20 individuals whose admission date could not be obtained. Calculation of the number of days fell into three categories depending on their status as an IL resident as of 12/31/2010. If a patient was admitted to a higher level of care prior to 12/31/2011, the number of days in IL was the difference between the transfer date to the higher level of care and the resident's original of admission. If the resident died while living in independent living, the number of days in IL was the difference between the date of death and the original admission date. If the individual was an IL resident as of 12/31/2010, the number of days in IL was the difference between 12/31/2010 and the original date of admission.

4.5   ANALYSIS OF DATA

4.5.1   Statistical Program for Social Sciences (SPSS)

Once the data was imported into the database, I created a variety of queries. I imported the queries into SPSS to analyze the data. Descriptive analysis of the data included frequencies, cross tabulations, and chi square. Differences were considered statistically significant where $p < 0.05$. A paired T-test was used to evaluation the Senior LifeSTEPS data.

5.0   RESULTS

This section describes the characteristics of STAY and nSTAY residents in terms of gender, age, marital status, falls, illnesses, and hospital admissions. It also discusses the extent with which the program is used by IL residents. In particular, the number of STAY residents receiving support with medication administration is presented.

5.1   GENDER, AGE, AND MARITAL STATUS OF STAY RESIDENTS

Demographic data provided a baseline profile of the IL residents at AH. The number of IL residents for 2009 and 2010 was approximately the same 184 and 189, respectively (Table 5.1). In 2009, 46.2% of IL residents were STAY and in 2010, 48.1% were STAY (Table 5.1). Approximately two-thirds of IL residents are female (Table 5.2). Among females, the number of STAY and nSTAY residents in 2010 was approximately the same 65 and 61, respectively (Table 5.2). Even though a difference in participation existed among males, with 58.7% percent nSTAY and 41.3% STAY, this difference was not statistically significant.

Table 5.1 Composition of Independent Living Residents by STAY Status, 2009-2010

	2009 n (%)	2010 n (%)
STAY	85 (46.2)	91 (48.1)
nSTAY	99 (53.8)	98 (51.9)
Total	184 (100.0)	189 (100.)

The majority of IL residents were 81-90 years old (Table 5.2), and 52.7% of the residents in this age group were STAY.   In addition, the data revealed a distinct pattern regarding use of the program by age group. Among IL residents aged 71-80 years-old, 15.8% were STAY and 84.2% were nSTAY. However, among those residents 91-100 years-old 71.4% were STAY and 28.6% were nSTAY.

Table 5.2 Gender, Age, and Marital Status of IL Residents by STAY Status, 2010

Characteristic	STAY n (%)	nSTAY n (%)	Total n (%)
Sex			
Male	26 (41.3)	37 (58.7)	63 (100.0)
Female	65 (51.6)	61 (48.4)	126 (100.0)
Age (years)			
63-70	0 (0.0)	2 (100.0)	2 (100.0)
71-80	6 (15.8)*	32 (84.2)*	38 (100.0)
81-90	59 (52.7)	53 (47.3)	112 (100.0)
91-100	25 (71.4)*	10 (28.6)*	35 (100.0)
101-103	1 (50.0)	1 (50.0)	2 (100.0)
Marital Status			
Married	31 (36.5)	54 (63.5)	85 (100.0
Single/Divorced/Widowed	55 (56.7)**	42 (43.3)**	97 (100.0)
Unknown	5 (71.4)	2 (28.6)	7 (100.0)

*p= 0.000027, chi square test
**p=0.011, chi square test

Just as there was a relationship between age and STAY status, there was also a relationship between STAY status and marital status. Residents who were single, divorced, or widowed were more likely to be in the STAY program than people who were married, with 63.5% of married residents in the STAY program, and 36.5% of married residents not in the program (Table 5.2). Likewise, 56.7% of single, divorced, or widowed residents were STAY compared to 43.3% in the nSTAY group.

5.2   PROGRAM ULTIZATION

Program utilization was used to determine the degree with which the 91 STAY residents used the program in 2010. About one-third of STAY residents consistently use the program each month. In 2010, 30.8% of STAY residents used the program 10-12 months per year, and 38.4% used it 1-3 months out of the year (Table 5.3). Residents used the program less 10-12 months if they: 1) Needed assistance after a hospital admission, 2) Received wound treatments, or 3) Had an illness that did not necessitate a hospital admission.

Table 5.3: Program Utilization of STAY Residents by Month, 2010

Months	Residents n (%)
1-3	35 (38.4)
4-6	12 (13.2)
7-9	16 (17.6)
10-12	28 (30.8)
Total	91 (100.0)

5.3   NUMBER OF DAYS IN INDEPENDENT LIVING

Since the STAY and nSTAY groups were different in terms of health status, it was not possible to determine whether the STAY program increased the number of days in IL. Regardless of this, the number of days spent in independent living was calculated for all residents through December 31, 2010.

5.4   MEDICATION ADMINISTRATION

The percentage of STAY residents who received either daily medication administration or a weekly medication box was relatively large. On average, 68% and 50% of STAY residents received medication administration support in 2009 and 2010, respectively (Table 5.4). A more detailed listing of monthly medication administration support for 2009-2010 is located in Appendix C.

Table 5.4 Average Monthly STAY Residents Receiving Medication Administration Support, 2009-2010

	2009	2010
Avg Monthly STAY Residents (n)	40	54
Avg STAY Receiving Med[*] (n,%)	27 (68)	27 (50)

*includes residents receiving daily medications or
 weekly medication boxes
  Avg=average

5.5   FALLS, ILLNESSES, AND HOSPITAL ADMISSIONS

Contrary to my hypothesis, the number of falls has increased since the start of the STAY program. Out of the four years studied, the most falls occurred in 2010. The total number of falls in 2009 was 79, and in 2010 the number increased to 87 (Table 5.5). Given the total number of IL residents, this means that 42.9% and 45.5% of IL residents experienced a fall during 2009 and 2010, respectively (Figure 5.1). Of the total number of falls, the majority involved a STAY resident, 63.3% in 2009 and 79.1% in 2010 (Figure 5.2). The percentage of total STAY residents who fell in 2009 and 2010 was 58.8% and 74.7, respectively (Figure 5.3).

Table 5.5 Falls and Illnesses by Year for IL Residents at Asbury Heights, 2007-2010

	Year				Total n (%)
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	
Falls	71 (62.3)	62 (50.8)	79 (56.8)	87 (61.3)	299 (57.8)
Acute/Chronic Illnesses	43 (37.7)	60 (49.2)	60 (43.2)	55 (38.7)	218 (42.2)
Total	114 (100.0)	122 (100.0)	139 (100.0)	142 (100.0)	517 (100.0)

From 2007-2010, the number of illnesses (acute and chronic combined) was relatively the same at 55-60 per year, except in 2007 when there were 43 illnesses (Table 5.5). Approximately 30% of residents had an illness in 2009 and 2010 (Figure 5.4). Out of all IL residents, the percentage of illnesses that involved STAY residents decreased from 75.0% in 2009 to 63.6% in 2010 (Figure 5.5). Likewise, the percentage of total STAY residents that had illnesses decreased from 52.9% in 2009 to 38.5% in 2010 (Figure 5.6).
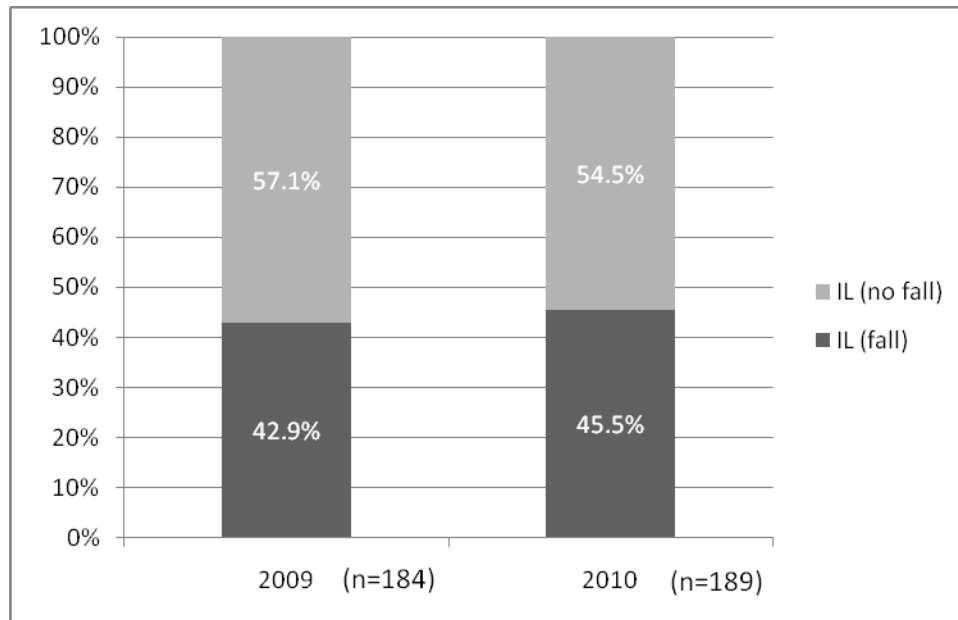
Figure 5.1 Percentage of Falls Among IL Residents, 2009-2010
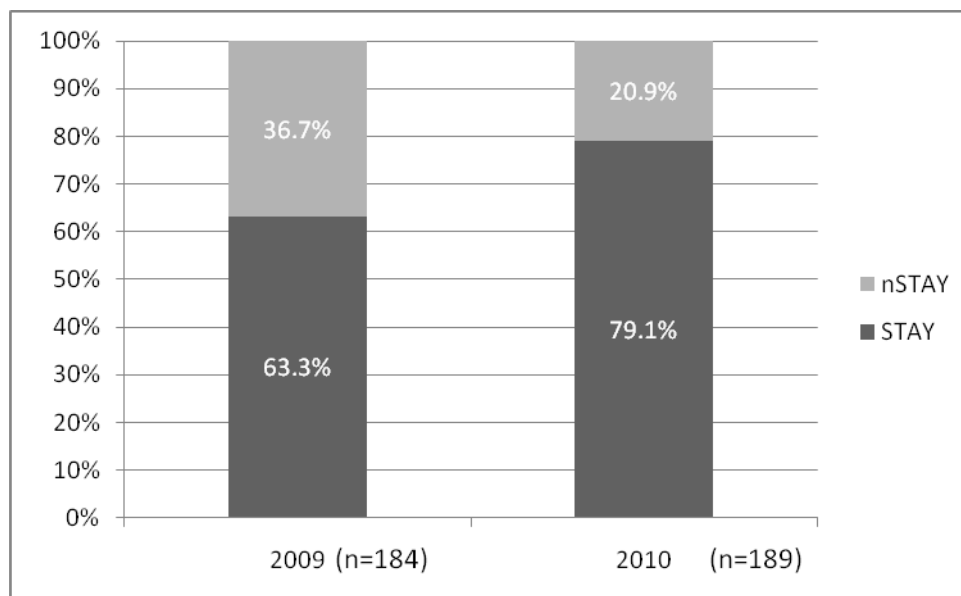
Figure 5.2 Percentage of STAY vs. nSTAY with a Fall, 2009-2010
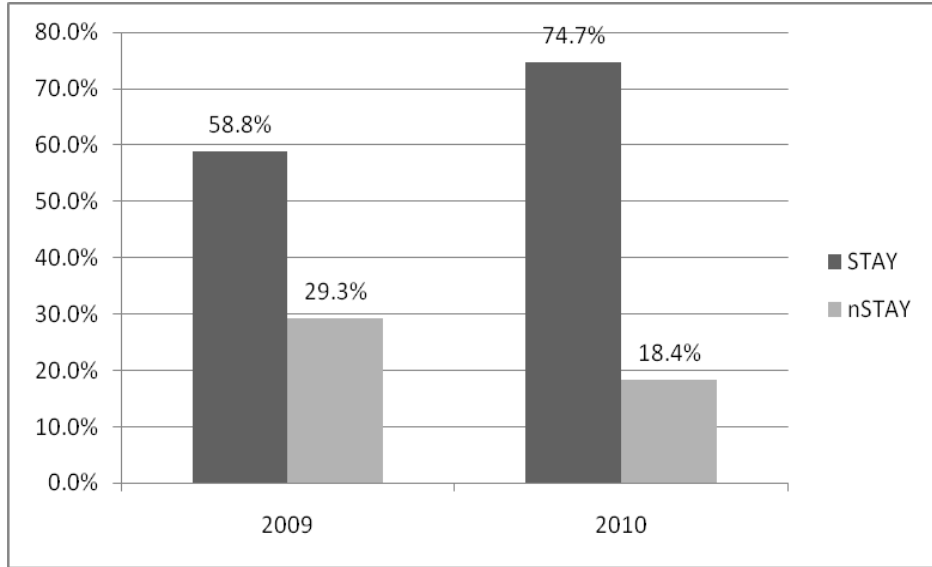
Figure 5.3 Percentage of Falls within STAY and nSTAY, 2009-2010
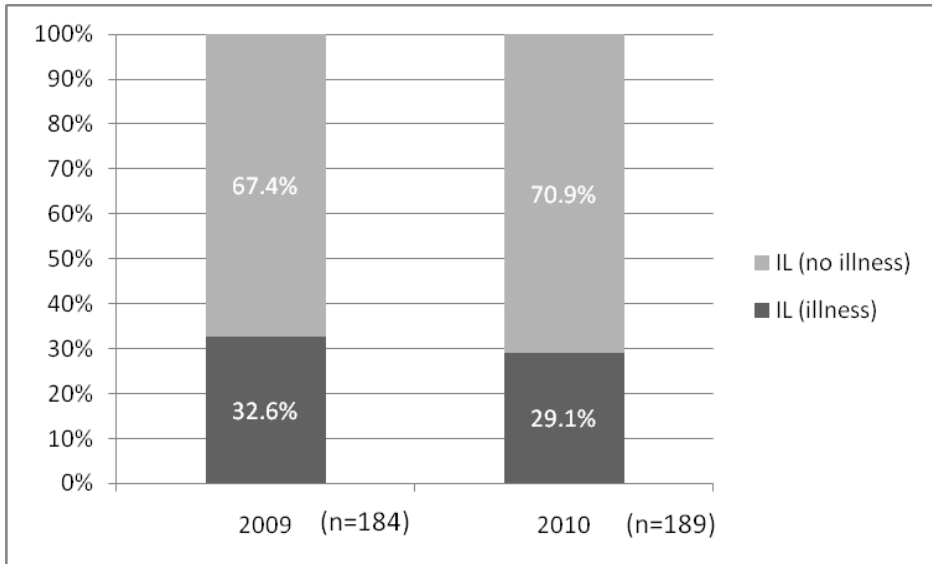
Figure 5.4 Percentage of Illnesses among IL Residents, 2009-2010
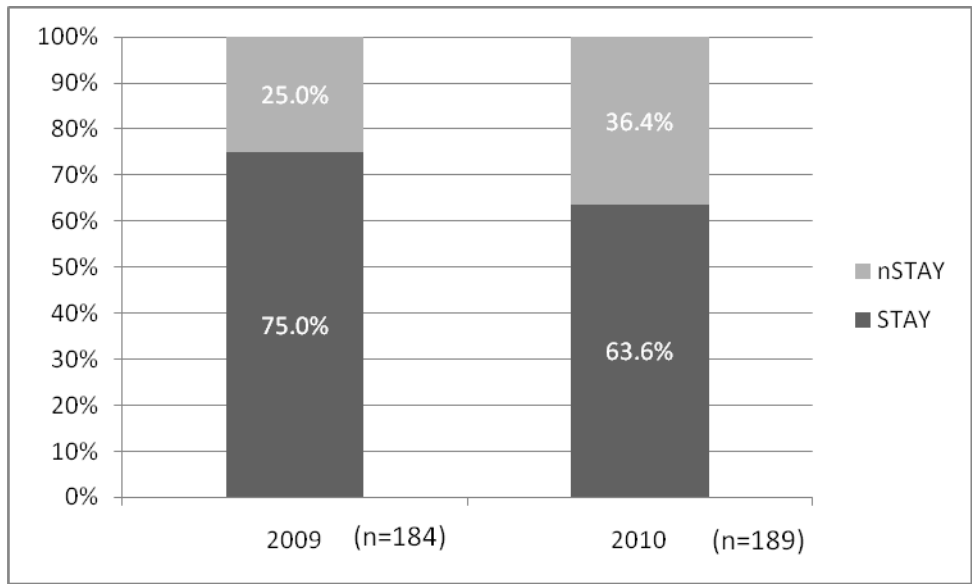
Figure 5.5: Composition of Illnesses by STAY Status, 2009-2010
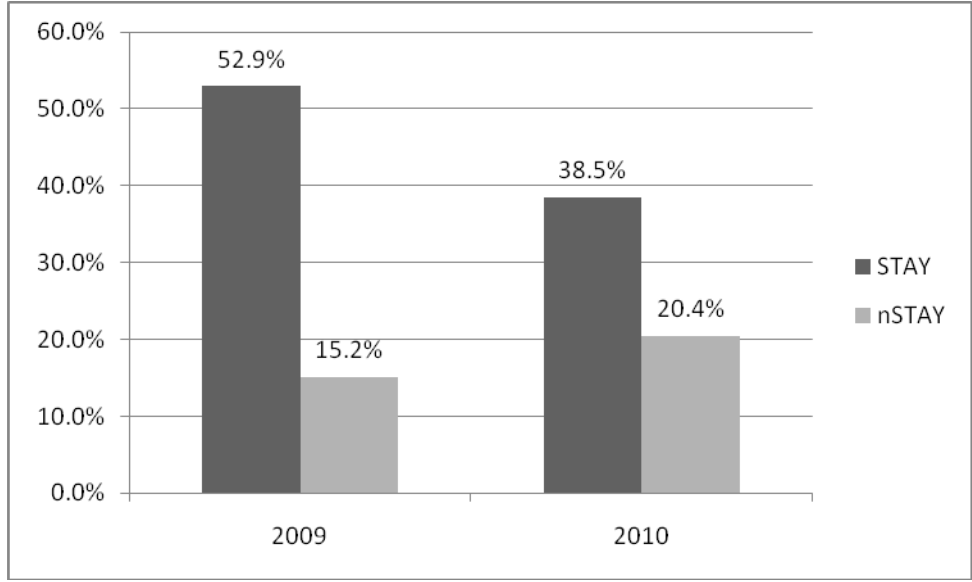
Figure 5.6 Percentage of Illnesses within STAY and nSTAY, 2009-2010

The percentage of residents that required transport to the hospital due to a fall or illness did not change after STAY began in 2009 (Table 5.6). However, the number of residents who were able to return to AH from the emergency room without the need for hospital admission has

been increasing since 2007 (Table 5.7). In 2007, 33.9% of those IL residents transported to the hospital did not require hospital admission, and in 2010, 44.9% of the residents that were transported to the hospital did not require admission to the hospital.

Table 5.6 Hospital Transfers by Year for Illnesses and Falls among IL Residents at Asbury Heights, 2007-2010

	Year				
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	Total
Transport required	56 (49.1)	72 (59.0)	84 (60.4)	78 (54.9)	290 (56.1)
No transport required	56 (49.1)	49 (40.2)	54 (38.8)	64 (45.1)	223 (43.1)
Incomplete data	2 (1.8)	1 (0.8)	1 (0.7)	0 (0.0)	4 (0.8)
	114 (100.0)	122 (100.0)	139 (100.0)	142 (100.0)	517 (100.0)

Table 5.7 Transport Outcomes by Year for IL Residents at Asbury Heights, 2007-2010

	Year				
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	Total n (%)
Admission	34 (57.6)	45 (61.6)	54 (62.8)	42 (55.1)	175 (59.5)
Taken back to AH	20 (33.9)	26 (35.6)	31 (36.0)	35 (44.9)	112 (37.8)
Incomplete data	5 (8.5)	2 (2.7)	1 (1.2)	0 (0.0)	8 (2.7)
Total	59 (100.0)	73 (100.0)	86 (100.0)	78 (100.0)	295 (100.0)

Consistent with the data on illnesses and falls, the year with the most admissions was 2009, the first year of the STAY program. The percentage of STAY residents admitted to the hospital decreased from 44.7% in 2009 to 33% in 2010 (Table 5.8). Approximately 70% of hospital admissions among IL residents in 2009 and 2010 were STAY residents (Table 5.9).

Among the hospital admissions of independent living residents in 2009, 70.4% involved a STAY resident compared to 29.6% by nSTAY. For 2010, the values for STAY and nSTAY were 69.8% and 27.9%, respectively. Although the admissions from STAY residents decreased in 2010, this decrease was not statistically significant.

Table 5.8 Hospital Admissions for Independent Living Residents at Asbury Heights, 2007 -2010

Year	Hospital Admissions (n)	Total IL Residents (n)	Percentage of IL Residents admitted (%)	STAY Residents (n)	% of STAY admitted to hospital (%)	% of nSTAY admitted to hospital (%)	Percent of total admissions 2007-2010(%)
2007	34	N/A	-	-	-	-	19.5
2008	44	N/A	-	-	-	-	24.7
2009	54	184	29.3	85	44.7	16.2	31.0
2010	42	189	22.2	91	33	11.2	24.7
Total	174				-	-	100.0

N/A= not available

Table 5.9 Hospital Admissions by STAY Status for Independent Living Residents at Asbury Heights, 2009-2010

Year	STAY n (%)	nSTAY n (%)	Total n (%)
2009	38 (70.4)	16 (29.6)	54 (100.0
2010	30 (71.4)	12 (28.6)	42 (100.0)
Total	68 (70.8)	28 (29.2)	96 (100.0)

5.6   HOSPITALS ADMISSION OUTCOMES

Once a resident was admitted to the hospital, a number of discharge outcomes existed (Table 5.10Table 5.10). Although some of the data for 2007, 2008, and 2009 was incomplete, there are some noteworthy results. In 2007 and 2008, prior to the STAY program, 17.9% and 34.8% of IL

residents who were admitted to the hospital returned to IL. After the program started, this value increased to 50.0% and 72.7% for 2009 and 2010, respectively. Between 2007 and 2010, the percentage of IL residents who returned to SN after a hospital admission decreased from 20.5% to 13.6%.

Table 5.10 Admission Disposition by Year for IL Residents at Asbury Heights, 2007-2010

	Year				Total n (%)
	2007 n (%)	2008 n (%)	2009 n (%)	2010 n (%)	
Returned to IL	7 (17.9)	16 (34.8)	28 (50.0)	32 (72.7)	83 (44.9)
Transferred to AL	1 (2.6)	0 (0.0)	2 (3.6)	1 (2.3)	4 (2.2)
Transferred to SN	8 (20.5)	11 (23.9)	19 (33.9)	6 (13.6)	44 (23.8)
Transferred to another facility	0 (0.0)	2 (4.3)	2 (3.6)	2 (4.5)	6 (3.2)
Death	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.3)	1 (0.5)
Remains at hospital	1 (2.6)	0 (0.0)	0 (0.0)	2 (4.5)	3 (1.6)
Incomplete data	22 (56.4)	17 (37.0)	5 (8.9)	0 (0.0)	44 (23.8)
Total	39 (100.0)	46 (100.0)	56 (100.0)	44 (100.0)	185 (100.0)

5.7   SENIOR LIFESTEPS RESULTS

Data for a total of 36 IL residents were available for evaluation (9 nSTAY and 27 STAY residents). Paired t-tests evaluated whether differences in the mean values for the Perlin Assessment Tool for Fall Risk, TUG, MMSE, and WCS among STAY residents both before and after the program were different (Table 5.11). Since the number of nSTAY residents with data was so small this group of residents was not analyzed. There was a significant difference in the scores among STAY residents for balance prior to the program (M=4.22, SD=2.044) and balance

37

after the program (M=5.44, SD=1.601); t(8) =-3.439. STAY residents also exhibited significant

differences for gait, TUG, and MMSE but not for WCS.

Table 5.11 Paired Sample Tests of Senior LIFEsteps Values for STAY Residents

Senior LIFEstep Assessment	Mean		n	SD		Mean Difference	t	Sig (2-tailed)
	Before	After		Before	After			
Balance	4.22	5.44	27	2.044	1.601	-1.222	-3.439	0.002
Gait	1.59	1.67	27	0.636	0.555	-0.074	-0.527	0.602
TUG	16.85	19.48	27	4.120	6.728	-2.630	-2.816	0.009
MMSE	25.41	27.30	27	3.165	2.959	-1.889	-3.663	0.001
WCS	4.37	4.04	27	3.272	3.057	0.333	0.655	0.518

6.0   DISCUSSION AND IMPLICATIONS

This section presents an overview of the evaluation's findings, lessons learned, and limitations. Recommendations and the public health significance are also discussed.

6.1   OVERVIEW OF FINDINGS

This evaluation was unable to conclude whether the STAY program increased the number of days in IL. Nor was a change in the number of hospital admissions and transfers caused by falls and acute/chronic illnesses among IL residents observed. Despite this, some promising trends for the number of illnesses and the disposition of residents upon hospital discharge were noted. I intended to compare the number of days residents spent in IL prior to the STAY program with the number of days spent in IL after the program by using residents in IL before the STAY program as a control group, and those in IL after the program as the variable group. However, an overlap between the groups made the preSTAY group a weak control. A main factor was this design did not account for a continuous admission of residents, each with varying durations of participation in the STAY program

In terms of the number of days in IL, residents fell into five groups, several of which overlapped one another (Figure 6.1). Due to this overlapping pattern and the fact that the

majority of the residents were in group E (n=155), it was nearly impossible to compare the number of days spent in IL before and after the program. To control for this overlap, future
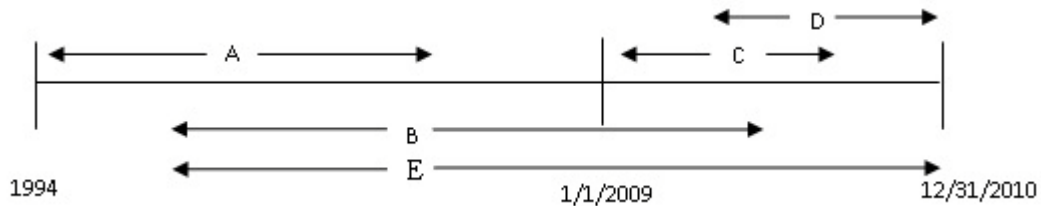

Figure 6.1   Overlapping Admission Pattern for IL Residents, 1994-2010

A= admitted to AH before STAY, change in level of care/death before STAY started
B= admitted to AH after STAY, change in level of care/death before STAY started
C= admitted to AH after STAY, residents remained in IL as of 12/31/2010
D= admitted to AH after STAY, change in level of care/death after STAY started and before 12/31/2010
E= admitted to AH after STAY, residents remained in IL as of 12/31/2010

studies may consider an approach used by Marek et al in which the study period was divided into quarters, and the subjects were matched based upon the date of admission.[25] While some of the data demonstrates that the STAY program is effective, it is not possible to definitively answer this question. Table 5.7 shows the percentage of residents who were transported to the ER and then returned to AH without being admitted to the hospital has been increasing since 2007. Although this data argues for the effectiveness of the STAY program, it simultaneously raises other questions: Are more patients with less severe illnesses being transported? Have the criteria for transportation changed since the program was implemented in 2009?

This evaluation did not find that the STAY program increased the number of days in IL and decreased the number of hospital admissions due to falls and illnesses. There are four explanations for these findings: 1) Poor primary data collection, 2) The program is ineffective, 3) The program is new and they are still making adjustments, and 4) Resources that help decrease the need to move patients to a higher level of care show paradoxical results. In other words,

40

prior to STAY, if a resident's condition worsened, he or she would be moved to a higher level of care before an illness occurred. People were transferred to higher care because they had deficits that no longer enabled them to meet the IL requirements. Prior to the program, a resident who fell may have been moved to AL, where he or she may have continued to fall, thus increasing the number of AL falls. Because of the STAY program, these frailer residents are able to remain in IL. If a population falls more because they are frailer, yet can still live in IL, they are increasing the number of IL falls at the expense of those that occur in the other levels of care. While it may seem there are actually more falls since the start of the program, that may be an indication that people are staying longer in IL.

The data does indicate that the nursing team identified the appropriate people for the program. The majority of falls and illnesses involve STAY residents (Figure 5.2 and Figure 5.5), which would be expected among frail people with medical conditions. Thus, residents who can benefit from the program are being appropriately identified. The majority of IL residents (60%) are between 81-90 years old (Table 5.2). People in this age range are more likely to require assistance and support to maintain an independent lifestyle. Consequently, the number of IL residents in this age group provides a useful way to anticipate whether there is adequate staffing to meet the needs of the residents. As the population ages, the number of residents in this age group is likely to increase as well and this increase would help justify the need to hire additional nursing staff.

Marital status and STAY status were associated at a statistically significant level with married residents approximately two times more likely to be nSTAY than in the STAY program. Likewise, residents who were single, divorced, or widowed were more likely to be STAY residents. These findings were not surprising since spouses are able to provide support for one

another. It is most likely that residents living at the Embassy, a 30-unit facility located a short distance from Asbury Heights, account for a large difference in the percentage between STAY and nSTAY for married residents since this group of nSTAY residents tend to be married and in better health than those living on the main campus.

Between the two types of adverse events, falls and illnesses, falls among the IL residents occur at a higher frequency than illnesses. With the exception of 2008, 60% of adverse events were falls, and 40% were illnesses (Table 5.5).   Not only were most of the falls among STAY residents, but the percentage of STAY residents who fell was high, 58.8% for 2009 and 74.7% in 2010 (Figure 5.3). These numbers indicate falls are highly prevalent among STAY residents.

Given that falls are the leading cause of unintentional injury-related deaths among older adults as well as the physical, mental, and emotional costs associated with falls among the elderly, specific attention to this problem is important.[46, 47] Additional analysis is necessary to understand better the profile of residents who fall. Strength training and exercise have been shown to decrease falls among the elderly, and AH provides access to exercise equipment.[48] Attendance at the fitness center within AH and exercise classes was tracked, and future work may consider evaluating whether gym attendance is associated with a decreased number of falls. Since the attendance data was not in an easily accessible format, it was not incorporated in this evaluation.

Because the STAY program is designed to help residents age in place, the number of residents who can return to IL after being admitted to the hospital can be used to indicate the program's effectiveness. Residents often require additional care once they return from the hospital. Therefore, an increase in the number of residents who return to IL after a hospital admission require STAY services would show that STAY nurses are able to provide this

supplemental care. Nearly 70% of hospital admissions in 2010 involved a STAY resident, and of these, 72.7% of the residents were able to return to IL (Table 5.10). In the first year of the program, 50% of IL returned to IL upon discharge from the hospital. These values are a sharp increase from 2007 and 2008, when only 17.9% and 34.8%, respectively, returned to IL. Despite this, it is not possible to make a definitive conclusion about the effectiveness of the program based on these findings. The discharge disposition was not available for 56.4% of the admissions in 2007 and 37.0% for 2008. Regardless, the results from 2009 and 2010 support the effectiveness of the STAY program.

Another way to assess the ability of the STAY program in keeping people in IL would be to evaluate use of STAY services following hospital discharge. Increased use of STAY services post hospital discharge would demonstrate the effectiveness of STAY.

When a program is either not working, or not displaying the anticipated results there are several explanations: 1) Lack of compliance among subjects, 2) The program or intervention was not effective, 3) The program evaluation was poorly designed, and/or 4) A program may be effective in ways that were not evaluated. The type of data that was collected from this evaluation does not demonstrate the ways the STAY program is effective. Even though predicted outcomes such as decreased hospital admissions did not occur, it is possible that the program is more beneficial than the results suggest; however, the evaluation did not collect the data required to demonstrate its effectiveness. For instance, we know that medication non-adherence is a problem among the general population, and especially among the elderly. Nearly 50% of STAY residents received medication administration support in 2010 (Table 5.4). The daily and weekly medication administration support is a unique function of the program. With the exception of the AIP program at Tigerplace in Missouri, no other interventions were found to

offer this type of support. Future studies may consider a way to calculate the physical, mental and financial savings associated with adherence and decreased hospital admissions.

Another area that may be studied further is outcomes from the Senior LifeSTEPS assessments. Since the Wassenaar Continuum Scale (WCS) comprehensively evaluates the ability for an older adults to live and function independently based on physical and psychological needs, changes in these values reflect overall changes in health status. Interpretation of the Senior LIFEsteps data indicates the health status of STAY residents did not decline over the two years; however, it is not possible to determine if this finding was due to the STAY program. These results should be evaluated with caution because the scores for all of the WCS subcomponents were not available at the time of this evaluation. Despite this, the difference for balance, TUG, and MMSE was in the direction of improved functioning (Table 5.11).

The ability for the STAY program to maintain health and decrease hospital admissions have a positive impact on AH, the health system (Medicare and Medicaid), residents, and their families. CCRC's like AH can only generate revenue if all of the beds are full. From a financial aspect, the STAY program allows AH to admit a frailer person to IL compared to other facilities because the program provides the resources needed to support that individual as an IL resident. Financially, it is in the best interest of AH for residents to remain in IL and avoid hospital admissions. If a resident requires a higher level of care after a hospital admission, and an empty room in SN is not available, AH loses revenue from this customer. Since IL residents that move to AH from the community are often healthier than a person who moves from the community to skilled nursing, the decision to move into IL is more a "choice" than a "need." For this reason, IL apartments are sometimes vacant for a month or two until a new resident is admitted. During this time, there is a decrease in potential revenue for AH.

6.2   LESSONS LEARNED

Conducting this evaluation has been a great learning experience about program evaluation and the lessons learned can be broken into ones that apply to evaluation in general and ones that apply to this specific evaluation. Most importantly, I learned the importance of a strong research design. An evaluation will answer the question(s) it was designed to answer. If you are seeking to answer a certain question, it is imperative that the evaluation is designed such that it will answer this question. Otherwise, the study will answer another question.

This experience opened my eyes to the challenges that occur when evaluating a program that has already been in place for some time. As a result, the value of incorporating evaluation during the program planning phase cannot be over emphasized. During the program design phase, public health providers must consider not only what outcomes will be measured, but also how the data for those outcomes will be collected and managed. For example, the data for falls and hospital admissions were not standardized. Falls and hospital admissions data for 2007 and 2008 were not as detailed as that for 2009-2010. As a result, the ability to conduct a before and after study design was limited since a portion of the data prior to the STAY program was either not available or missing.

Although valuable data had been collected by the team at AH, it could not be easily analyzed in a spreadsheet format. Many of the desired outcomes required a comparison between STAY and nSTAY residents by a given characteristic. Whereas spreadsheets facilitate data calculation, databases are helpful for understanding the relationship between data. The data needed for this evaluation was scattered across a combination of electronic and paper-based collection systems, neither of which were compatible with one another. The residents' demographic and health-related data was housed in paper-based charts as well as a commercially

available software package called Answers on Demand, that tracks the operations of long-term care organizations such as CCRC's, IL, AL, SN, and rehabilitation centers.[49] The data that captured the resident's falls, hospital admissions, and STAY contacts were located in three separate spreadsheets. The Senior LifeSTEPS data was housed in a paper based format; it was also located in an online database. However, only aggregate-level data could be accessed after individual data had been entered online. Database design should also occur during the initial planning phases of the evaluation in order to meet the needs of the evaluation team.

6.3   LIMITATIONS

The limitations of this evaluation included an inadequate control group and missing data.

Part of the reason this evaluation was unable to answer the question, "Does the STAY program increase the number of days spent in IL?" is the result of a weak control group. Instead of answering this question, this evaluation determined "Is there a difference between the characteristics of a STAY and nSTAY residents?   The characteristics of a control group should be similar to the intervention group with the exception of exposure to an intervention. In this case, STAY residents were found to be different from nSTAY residents in terms of health and marital status. The majority of hospital admissions involved STAY residents and nSTAY residents tended to be married while most STAY residents were single, divorced, or widowed. In 2010, STAY residents were 4 times more likely to experience a fall and 1.75 times more likely to have an illness than nSTAY residents.

Some of the data analysis was limited by missing data and the lack of a standardized approach to data collection. The ability for IL residents to return to IL upon hospital discharge

was considered a relative indicator of the program's effectiveness. Although there was a trend for increasing return to IL, missing admission disposition data for 2007 and 2008 limited a definitive conclusion (Table 5.10).

6.4   PUBLIC HEALTH SIGNIFICANCE

Finding ways to help older adults AIP and maintain their independence is a significant public health concern facing this country given the number of people 65 and older that currently exist in the United States. The STAY program provides a unique way for older adults to maximize quality of life as they AIP. Despite the outcomes of this evaluation, this type of program has the potential to decrease healthcare cost by reducing hospital admissions due to medication non-adherence, falls, and illnesses.

7.0   SUMMARY OF FINDINGS AND RECOMMENDATIONS

The data presented in this thesis cannot support the hypothesis that residents in the STAY program had a better quality of life through a greater number of days spent in IL and a lower number of hospital admissions compared to those not in the STAY program. It is most likely that residents who were not in the STAY program were healthier than those in the STAY program. To determine whether the STAY program increases the number of days spent in IL and reduces hospital admissions, we would need a more powerful research design that includes a control group that is similar in terms of health status and function. However, the data are useful in assessing the relative health of the residents on a number of outcome variables as well as the number of falls, illnesses, and hospitalizations before and after the program. This evaluation concluded three major findings and recommendations:

1)   The STAY Program is a high quality program.

It is clear that the STAY program and nurses are providing a high quality of care and the residents are satisfied with the care they are receiving based upon the qualitative findings of Laura MacBeth. The STAY nurses are well trained and truly care about the well-being of the residents they serve. It is also clear that the nurses personally bond with the residents they care for. The residents recognize the care they receive because they spoke highly of the nurses.

2) The development of an electronic data system will support program planning and evaluation studies.

Specifically, I am recommending that the staff work towards an integrated system that contains data about resident health status, treatments, prevention programs, and outcomes. Asbury Heights is an impressive organization and the STAY program is just one of the progressive services available to its residents. Because of its progressive nature and the desire to be leaders of care among older adults, a robust data collection and reporting system are critical.

The current data collection system utilizes both a paper-based and electronic format. Answers on Demand (AOD) is the primary electronic-based data collection system used at Asbury Heights. AOD and the patient's chart contain the patient's demographic and health status information, but several other patient related sections are not currently being utilized. The STAY Excel spreadsheet and the MARS and TARS indicate the type(s) and frequency of services received by a resident. The Senior LIFEsteps assessment findings exist in a paper-based format and online at a website maintained by Health Resources Alliance.[50] Fall and hospital transfers are tracked in two separate spreadsheets. As a result, if a resident is transferred to the hospital because of a fall, this incident is tracked in two different locations. The Fitness Center, which is maintained by Health Resources Alliance, uses yet another data system to track attendance in the SeniorFITness Program.

An integrated electronic data collection system will improve accuracy, decrease errors, increase patient safety and quality of care through a reduction in redundancy, and increase efficiency, which will allow the staff to spend more time on value added services for the organization. Presently, STAY nurses visit with patients and records their assessment findings in small spiral bound notebooks. When they return to the STAY office, they record these findings

in the MARS and the TARS. Not only does this step create extra work, but it introduces the potential for documentation errors. The documentation process is sometimes interrupted by phone calls from physicians as well as the residents. The residents' charts, which are currently located in the STAY office, occupy a significant amount of space. An electronic-based data collection system would reduce the redundant aspects of the current system, and the elimination of paper-based charts would provide room in the office for an additional workstation.

In particular, Marcy Bryers, Director of Health Services, would particularly benefit from an integrated database. She spends a significant amount of time compiling monthly statistics for the STAY program. Each month she reviews the MARS and TARS for each resident, and records the number of services each resident received. Not only would an integrated data system tally the number of services automatically, but it would be able to provide a higher level of detail about each patient encounter. Appendix C.2 contains sample tables from the Microsoft Access database that was created for this evaluation.

The value of an integrated data system is the ability to combine information from several sources, such as AOD, STAY, SeniorFITness, falls data, and Senior LIFEsteps, in order to determine how each one is affecting one another. Yet another key feature would be the ability to determine the effect that several programs are having at the individual level. An integrated data system will give an even clearer picture of the type of residents who are falling. For instance, with an integrated system it would be possible to determine 1) how many STAY and nSTAY residents are exercising? 2) Are those who are exercising less likely to fall? 3) Are those who exercise less likely to be admitted to the hospital? 4) Does exercise improve scores on the Senior LIFEsteps, and 5) Does exercise increase the number of days in IL? With an integrated

data system, Asbury Heights would be able to tailor further the services that residents are receiving to ensure the highest quality of life.

3) Implementation of a Fall Preventions Program

Staff should discuss the implementation of a fall prevention program for all IL residents, in particular the STAY residents. Falls are highly prevalent among IL residents; 60% of all incidents were falls compared to 40% for illnesses (Table 5.5). The necessity for a fall prevention program is further supported by the well-known physical, psychological, and financial costs associated with falls[51]. Older adults fall more due to an increase in biological, environmental, and behavioral risks factors such as chronic diseases, vision loss, medication side effects, inactivity, home and environmental hazards.[51] Despite this, falls are preventable and a number of effective evidenced-based fall prevention programs exist.[52] In 2008, the Centers for Disease Control and Prevention published, "Preventing Falls: What works CDC Compendium of Effective Interventions," which contains a number of evidence-based fall prevention programs.[52]

4) Partnership with other organizations

Asbury Heights may consider developing a partnership with Tigerplace in order to collaborate on projects and share ideas. Marilyn Rantz and the rest of her team from the Sinclair School of Nursing and Family and Community Medicine at the University of Missouri are using computer science and health informatics students to develop technology which can improve the quality of life for older adults. A partnership between AH and Tigerplace would benefit the programs at both organizations, enhance the ability to receive grant funding, and increase the generalizability of findings.

APPENDIX A

STAY PROGRAM LOGIC MODEL

Questions:

-Are the program's objectives reasonable given the resources that are available?

-Is the STAY program meeting its objectives and how do we know this?

-How well is STAY being managed?

-Are any there unanticipated events occurring? How reported?

-What are the benefits of STAY for patients, families, staff?

-How effective is the STAY Program at keeping people in Independent Living longer?

-Do the costs outweigh the expenses?

-Are the program costs reasonable given the benefits received?

-How effective is STAY at attracting new customers? Why aren't more people in STAY?

-Are more residents coming forth with their problems?

Mission:
Improve the lives of older adults through high-quality and compassionate care.

Provide a way for older adults to maintain their independence in their current home.

Inputs	Outputs		Impact		
	Activities	*Participation*	*Short*	*Medium*	*Long*
1. Time 2. Marcy Byers, Stacy Mikelonis 3. Independent living residents and families 4. Pitt Eval Team 5. STAY Nurses	1. STAY program 2. Conduct STAY Awareness Survey Measure residents' current knowledge of STAY? 3. Educational offerings for residents that enable and encourage independence and QOL 4. Ageless Wisdom: Sensitivity Training Program 5. Develop process and outcomes evaluation tools/instruments 6. Conduct process and outcomes evaluations 7. Report results to stakeholders	1. STAY program nurses, Stacy, Marcy 2. Residents 3. Family members	1. Increased knowledge and trust of STAY services among residents and family 2. Increased understanding of unique needs of older adults by staff members. 3. Improved care provided to residents using STAY 4. Amount of services offered through STAY increases/decrease use of ext. resources 5. Improved communications through family conferences with STAY nurse 6. Residents increase knowledge about medical, nutritional, and life skill topics and are more comfortable and confident in their ability to maintain their independence	1. Increased use of STAY services by residents Increased number of existing residents who apply for STAY 2. Staff practice techniques from Ageless Wisdom 3. Residents apply techniques from educational programs	1. Length of time residents stay in independent living increases 2. Asbury realizes fee income from some STAY services 3. STAY decreases crisis situations 4. Increased # of residents attracted to Asbury because of STAY

Assumptions
-STAY Program will keep residents in independent living longer.
-Demand will increase as others hear about STAY services
-STAY will decrease hospital admissions from preventable causes
-STAY financial benefits outweigh expenses

External Factors
-Money
-Progression of chronic disease that requires more advanced care than STAY can provided

Outputs		Outcomes		
Activities	Participation	Short	Medium	Long
Evaluation Questions				
2. How many residents know what STAY is? How do patients find out about STAY? Why do some join and others don't? 3. Were educational offerings conducted? 4. Was Ageless Wisdom conducted? 5. Were process and outcomes evaluation tools/instruments developed? 6. Was a report for the stakeholders prepared?	1. What is the number of STAY contacts per person, number residents using each type of STAY contact? 2. What is amount of time per contact? 3. Are the types of contacts that residents feel they are not getting?	1. Did knowledge of and interest in STAY increase? 2. Did staff increase their understanding of the unique needs of older adults? 3. Did STAY provide improved care to patients? 4. Did amt of services offered by STAY increase, and was there a decreased use of outside services? 5. Do family conferences with STAY nurses result improved communications? 6. Did residents knowledge increase from the educational programs?	1. Did number of people enrolled in STAY increase? 2. Did the staff implement techniques from Ageless Wisdom? 3. How many residents applied techniques from educational programs?	1. Does amount of time in independent living increase compared to a nursing home without STAY? 2. Does income from STAY increase? 3. Could the hospital visits for residents not in STAY have been prevented with STAY 4. Is there a reduction in number of ER transports and hospital admissions?
Indicators				
2. Number people aware of STAY, reason join/not join STAY 3. Number and types of educational offerings conducted 4. Number/percentage of people who attend Ageless Wisdom 5. Process and outcomes evaluation tools/instruments 6. Report to stakeholders	1. Number of STAY contacts per person, number of residents using each type of contact 2. Number of minutes of time per contact/type of contact 3. Types of contact residents are not receiving?	1. Number/percentage residents with increased knowledge and interest in STAY 4. Number of services offered and number of outside services used 5. Changes in perceptions of nurses, patients, and family members 6. Number/percentage of patients with increased knowledge from educational programs	1. Number/percentage of new people enrolled in STAY 2. survey by management of staff 3. Number/percentage residents who applied techniques from educational programs	1. Decreased unit turnover rate and number months in independent living increases 2. Number/percentage increased revenue from STAY 3. Number of hospital visits among non-STAY residents that that could have been prevented with STAY 4. Number and cost of ER transports/hospital admissions

54

APPENDIX B

STAY PROGRAM DATABASE

B.1   RELATIONSHIPS FOR STAY PROGRAM DATABASE

B.2 STAY PROGRAM DATABASE SCREENSHOTS

STAY Program Database

Asbury Heights
† Operated by United Methodist Services for the Aging

| Residents |
| STAY Contacts |
| Incidents |
| Reports |

STAY Contact

Last Name		First Name		Add STAY Contact
MR NO		STAY Contact	(New)	Delete STAY Contact
Month		Service Date		Save STAY Contact
Year		Service Start Time		
Num times/period		Service End Time:		

Num periods

Service ID:

Notes

Employee

Record: I◄ ◄ 1710 of 1710 ► ►I ►* No Filter   Search

Record: I◄ ◄ 1 of 1 ► ►I ►* No Filter   Search

View   Num Lock

STAY Program Database

Asbury Heights
† Operated by United Methodist Services for the Aging

| Residents |
| STAY Contacts |
| Incidents |
| Reports |

Incidents and Dispositions by Incident ID Number

MR NO:		ID:	(New)	Add Incident
Last Name:		First name:		Delete Incident
Incident ID:				Save Incident

Incident type:

Notes:

Incident date:

Incident time:

Incident location:

Disposition

Incident Disposition :

Transport Disposition:

Hospital:

Admission Disposition:

Date Admission:

STAY Status:

Date STAY Status Update:

Record: I◄ ◄ 1 of 1 ► ►I ►* No Filter   Search

View   Num Lock

58

APPENDIX C

MEDICATION ADMINISTRATION SUPPORT

STAY Residents Receiving Medication Administration Support, 2009

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Avg
STAY Residents (n)	38	45	46	43	38	42	39	35	39	34	44	39	40
STAY Receiving Med* (n,%)	18 (47)	26 (58)	29 (63)	30 (70)	29 (76)	27 (64)	28 (72)	27 (77)	26 (67)	29 (85)	29 (66)	28 (72)	27 (68)

    *includes residents receiving daily medications as well as weekly medication boxes

STAY Residents Receiving Medication Administration Support, 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Avg
STAY Residents (n)	48	52	55	57	55	54	47	53	53	58	58	52	54
STAY Receiving Med (n,%)	23 (48)	26 (50)	28 (51)	27 (47)	30 (55)	31 (57)	26 (55)	26 (49)	29 (55)	28 (48)	20 (34)	27 (52)	27 (50)

    *includes residents receiving daily medications as well as weekly medication boxes

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