Data Validation Study for Thirty-day Hospitalization Rates

Prepared for:
Home Healthcare Partners, LLC

The Brittain-Kalish Group, LLC
In partnership with
the Department of Health Management and Policy,
School of Public Health, University of North Texas Health Science Center

July 25, 2010

Executive Summary

Home Healthcare Partners LLC (HHP) is a leading telehealth homecare company. Working on the leading edge of technology in their processes, HHP developed a data repository for the ease of providing and managing healthcare services for their patients. The data integrated in this repository (Cube) comes from different telehealth, medical records and billing systems. Within the analysis of the patient data, HHP recognized a downward trend in the hospitalization rate of those patients where telehealth was introduced into their care. In order to substantiate those data, HHP engaged the Brittain-Kalish Group, LLC in partnership with the University of North Texas Health Science Center, School of Public Health to conduct an independent analysis of their findings. This allowed HHP to validate the accuracy of their data by an independent third party with expertise in data collection, management and analysis and also helps them to evaluate the effectiveness of their telemonitoring program.

The project was comprised of:

- An evaluation of the accuracy and completeness of the data elements transferred to the data repository with a validation of rules
- A review of the data entry and evaluation process using OASIS, with confirmation of checks and balances in the system
- A confirmation of the analysis process and formulas for reporting outcomes

In all instances, HHP data and processes were found to be well documented and the analytical methods employed by HPP were deemed to be logical. The data outcomes were able to be replicated using different statistical methods with the same data sets. UNTHSC SPH determined that the data in the Cube was reliable and, thus, rather than manipulating the data directly from the HHP systems, after documenting process, the data available from the Cube was employed for the analysis. UNTHSC SPH found a couple of nuances to be adjusted within HHP's rules but, overall, the data can be used for further analysis and will be critical in building predictive models for future care.

With the recent focus on healthcare reform and the need to provide a continuum of healthcare services, with increased quality and lower costs, HHP has developed a model that will fit exceptionally well into the new push for Accountable Care Organizations. As they move forward, their partnership with physicians and hospitals will be a key in reducing the rates of hospitalizations for their patient population.

Introduction

Home Healthcare Partners, LLC (HHP) was founded as a traditional homecare company, but has evolved into a leading telehealth company with a chronic disease management focus. They are based in Dallas, Texas and serve the needs of patients throughout Louisiana and much of Texas. Their telehealth specialty began four years ago in order to provide high quality care to chronically ill patients. HHP currently provides daily telehealth care to approximately 1,800 patients, which are about 48% of HHP's Medicare census. By the end of FY 2010, HHP's telehealth patient days will exceed 1,000,000, which will provide a significant amount of data for analysis.

The telehealth hardware used by HHP provides the capability for monitoring blood pressure, heart rate, weight, oxygen saturation levels, and will accommodate optional glucometer and peak flow meter attachments. HHP also has developed proprietary software systems that are directly linked to their patient billing, telehealth monitoring and accounting systems. This software system has the capacity to generate detailed patient information, including hospitalization rates. HHP believes that their system is unique within the home healthcare industry and that its integrated and comprehensive structure contributes to a significant reduction in hospitalization rates for HHP telehealth patients. HHP's current data indicates that their 30-day hospitalization rate for Medicare beneficiaries on HHP telehealth services is 6.7%, while those on HHP non-telehealth services is 15.4%. This is compared against the entire Medicare beneficiary population rate of 19.6%.

** Stephen F. Jencks, M.D., M.P.H., Mark V. Williams, M.D. and Eric A. Coleman, M.D., M.P.H., "Rehospitalizations among Patients in the Medicare Fee-for-Service Program", New England Journal of Medicine 360:14 (2009):1418-1428*

Project Purpose and Scope

HHP engaged the services of the Brittain-Kalish Group LLC (BKG), in partnership with the University of North Texas Health Science Center School of Public Health (SPH), to conduct a data validation study comparing the 30-day hospitalization rates for telehealth Medicare beneficiaries and those on non-telehealth services. The data validation study:

- Evaluated the accuracy and completeness of the patient data elements that are transferred from the billing system and the telehealth system to the Qube, which is the proprietary data repository used for analysis.
- Documented and reviewed the OASIS data entry process and confirmed that proper checks and balances are in place for patient data entry.
- Validated the rules used for the system data transfer as provided by HHP.
- Validated the analysis process and formulas for reporting outcomes, such as hospitalization rates.

The validation of the patient data in the data repository has a direct impact on how HHP establishes their performance metrics and their future business models.

Key Program Initiatives

Leadership and vision are the keys to the HHP Program. Leadership is focused on providing the highest level of patient care, in order to reduce the number of preventable hospitalizations. Patients are placed on the telemonitors based on need, not necessarily as a result of a specific diagnosis. The focus is on the risk of being admitted to or returning to the hospital within the first thirty days of care.

HHP also provides Health Coaching. The telehealth clinicians work daily with HHP patients to provide education and support in managing all aspects of the disease, from assessment to increasing their understanding of nutritional need and other challenges in their lives. Telehealth clinicians provide as much care as they can to the patient and solve as many problems as possible before contacting a field clinician. Many of the problems patients experience are addressed and resolved in this process. The telehealth case managers are all ICU experienced clinicians. They are confident in their assessment skills, assertive in their treatment, and compassionate in their care.

Most importantly, the provision of services is all about building relationships with patients. Establishing trust, providing human contact and genuine personal care create significant changes in outcomes, ultimately reducing preventable hospitalizations.

Information System Review / Leadership and Staff Interview

BKG and SPH project partners (Team) interviewed HHP leadership for a systems review which included:

- An introduction to LifeStream (telehealth monitoring system) and Patron (patient medical record and billing system).
- Patient assessment process using the CMS OASIS assessment tool.
- The patient database (Cube) field definitions.
- The rules for moving the patient data from LifeStream and Patron to the Cube electronically.
- A review of the patient data elements that are manipulated manually.

Through this review, the Team determined that the data in the Cube was reliable for the validation and statistical analyses and, thus, the Cube data was utilized in the study rather than using the patient data directly available from LifeStream and Patron.

Patient Assessment and Billing Process

In interviews with HHP staff, the patient encounter and billing data includes three checks and balances.

1. The clinical personnel complete the patient assessment using the Medicare OASIS questionnaire (CMS standardized assessment document for home health care), using digital pen technology.
2. Data entry staff enters OASIS data into Patron.
3. Episode Master in Patron compares OASIS data by episode for each patient to address any conflicting answers or outliers.

4. The patient information goes to coding and billing, where the OASIS data are analyzed against worksheet algorithms and PPS case mix rate to determine appropriate billing.

This process indicates that proper checks and balances are in place for capturing patient data and billing for services.

Rule Validation for System Data Transfer

Process mapping and rules review applied to the data from Patron and LifeStream to the data repository, the Cube.

Thirty- day Outcome Rules:

- Each patient's length of stay is divided into 30-day "buckets" and each 30-day bucket is analyzed independently. This is defined as Start of Care (SOC) + 29, SOC + 60 -31, and so forth. The definition for admission days requires the count of the first day as day one, and the day of discharge is not counted.
- If a patient spends 1-30 days on a telemonitor, the patient is counted as a telemonitored 30-day patient and all events during the 30 days are assigned as telemonitor outcomes.
- With 0 days on a telemonitor, the patient is counted as a non-telemonitored 30-day patient and all events during the 30 days are assigned as non-telemonitor outcomes.
- All hospitalizations are counted regardless of reason, whether scheduled or unscheduled.
- All formulas to calculate 30-day outcomes are included in raw Excel files.

Chronic Category:

- Each diagnosis is assigned a chronic category, if applicable.
- If a patient has multiple chronic diagnoses, the following order rules are used to determine the reporting chronic category:

CHF > COPD > Cardiac > Diabetes > Hypertension > Alzheimer > Other

Episode Number definition:

- Episode number = (SOE-SOC)/60+1 and eliminate the decimal.

Telemonitoring – Hospital determination process:

- The data are extracted electronically from LifeStream.
- In LifeStream, when a patient is admitted to a hospital, there is a click box for "admitted to hospital" with an associated date.
- In LifeStream, when a patient is discharged from a hospital, there is a click box for "discharged from hospital" with an associated date and reason code.
- Two or more days of non-testing in LifeStream triggers a direct staff contact with the patient or caregiver for patient status. Then the data are corrected manually, which includes the notation for possible hospitalization. This is a safety precaution to assure no hospitalizations are missed and to account for human error.

Income Level – based on ZIP code data, which includes average income.

Episode Data pulled from Patron into the Cube:

All episodes are extracted from Patron from the Patient Episode table. These data get extracted through an Integration Services ETL (Extract, Transform, and Load) process. The data are loaded into Fact Tables and Dimensions for the Cube structure. A Data Warehouse is created in the Cube that pulls from these tables and allows HHP to analyze and compare the data by various patient characteristics such as Diagnosis, Age and County.

Life Stream Periods:

The LifeStream Patient Period is pulled from a csv (Excel) file uploaded from LifeStream every two hours. This file contains Office Site, Patient Name, Start Date, End Date, Social Security Number, and a Custom field.
The data are joined to the Cube episode table by Social Security Number and by the dates of the Period. The telemonitor dates must fall anywhere in the episode dates range to be considered a telemonitored Episode.
TM Days are the number of days for the entire telemonitor Period.
Episode Days are the number of days in an episode (will always be 60 or fewer).
TM Episode Days are the number of days the episode was telemonitored (will always be 60 or fewer).

Actual TM Start Date:

HHP staff receives files for the patient's readings for vitals, peak flow and glucose. The reading data is checked to assure validity, specifically that there are data in the columns and not just nulls or blanks. Then, each patient record is checked for the first valid reading which sets the actual start date to that date. The system of reading data began on June 3, 2009, when HHP went live on LifeStream.

The team has reviewed the processes and agrees that sufficient checks and balances are in place to assure valid data transfer into the Cube. This also implies definitive processes for data analysis.

Data Analysis and Key Findings

Analysis conducted by Hsueh-Fen Chen, PhD and José A. Pagán, PhD

Data accuracy and completeness are key elements for evaluating the effectiveness and efficiency of a program or policy. Home Healthcare Partners (HHP) adopted telemonitoring (TM) in 2006 to improve the quality and efficiency of home healthcare services delivered to patients. HHP collected data on all home healthcare patients through the development of a central data repository with system interfaces from LifeStream, their telehealth monitoring system and Patron, the home health billing system. HHP checked and maintained the correctness of the data for each patient. Given that the majority of home healthcare patients at HHP are Medicare patients and that the highest possibility for patients experiencing hospitalization is in the first 30-days of the first episode, this project focuses on the first 30-days of the first episode for Medicare patients only when estimating hospitalization rates for different groups.

The research team in the Department of Health Management and Policy at the School of Public Health (SPH) of the University of North Texas Health Science Center has collaborated with the Brittain-Kalish Group, LLC in evaluating the effectiveness of the HPP TM program. There were three major tasks for the SPH research team to evaluate the TM program.

1. The SPH research team was to validate and verify the correctness and completeness of the data collected by HHP, suggest corrections and ask for clarifications when necessary.
2. The SPH research team was to evaluate the effectiveness of the HHP TM program by comparing the hospitalization rate for patients between TM and non-TM groups.
3. The SPH research team was to identify the risk factors impacting the hospitalization rate for the top five chronic diseases (which covers the majority of home healthcare patients at HHP).

This process allowed HHP to not only validate the accuracy of their data by an independent third party with expertise in data collection, management and analysis, but also assisted HHP in evaluating the effectiveness of their TM program. The clinical care team at HHP is also able to reduce the number of hospitalizations through early intervention and improve the quality of care for home healthcare patients by identifying patients' risk factors for hospitalizations through this project.

In order to evaluate the correctness and completeness of the data, further investigate the effectiveness of the TM program at HHP, and identify patients' risk factors for hospitalization, the SPH research team successfully translated the database provided in an Excel file to a SAS database for crosschecking and validation.

Key Findings

Data Description

The database has 6,984 observations (episodes) and 75 variables labeled from Corp Name to Chronic Category. The data validated includes the period from November 1, 2008 to December 31, 2009, and the sample included patients whose date for start of care (episode) was on or later than November 1, 2008 and whose date for end of episode was between January 1, 2009 and December 31, 2009. Thirty-seven observations were excluded because the date for the start of episode is earlier than November 1, 2008 (after obtaining clarification from HHP on May 21, 2010). The total complete observations are 6,947. These are the episodes used in the analysis and modeling. The earliest date for the start of care is November 3, 2008.

The date for start of care (SOC) should be the same as the start of episode (SOE) date. There are 17 observations with inconsistent dates between SOC and SOE in the first episode. The inconsistence was the result of a typographical error and HHP recommended to the SPH research team to use SOE instead of SOC for these 17 cases (email communication between SPH and HHP on June 1, 2010). The earliest end of date is January 1, 2009 and the latest end of date is December 31, 2009. There were 2,822 patient episodes whose end of date was before the scheduled end of episode; that is, these patients were discharged early. Five hundred and forty four patients had more than one episode and these patients accounted for a total of 1,143 episodes during the study period. Finally, the variable of date for start of care plus thirty (SOC_30) captures the first 30-days in the first episode. The difference between (SOC_30) and SOE dates in the study samples was no more than 30-days, which meets the stated criterion.

Table 1 presents the number of observations and percentage distribution by age, gender, and chronic disease for all episodes analyzed. Among all observations, the largest group includes participants between 75 and 84 years of age (16.57% for 75-79 and 17.89% for 80-84). The next largest groups of observations are those whose age range is in 65-74 and 85-94 (about 25% for each group). The smallest group includes observations whose age is older than 95 years of age. There are 958 observations whose age is less than 65 years old. These patients qualified for the Medicare program because they were disabled for 24 months (email communication with HHP on May 27, 2010). The definition of disabled follows the Medicare requirements which are:

- You are younger than age 65 with a disability and have received Social Security Disability Insurance (SSDI) or Railroad Retirement disability payments for 24 months.
- You have amyotrophic lateral sclerosis (ALS) — also known as Lou Gehrig's disease — and have received your first month of SSDI payments.
- You have end-stage renal disease (ESRD) — permanent kidney failure — and require dialysis or transplant.

Almost 63% of all qualified patients were female. In terms of the chronic disease category, except for the OTHER (41.21%) category, the order from the largest proportion to the smallest proportion of the chronic disease in the study sample is hypertension (15.47%), diabetes (13.66%), congestive heart

failure (10.61%), cardiac diseases (9.10%), pulmonary diseases (8.08%), and Alzheimer's (1.87%). There are 823 (11.88%) patients experiencing at least one hospitalization during the first episode of home health care and, among them, 106 patients experienced more than one hospitalization.

Table 1. Distribution of Age, Gender, and Chronic Diseases for all Observations

	Number of observations	Percentage
Age		
<65	958	13.79
65-74	1,711	24.63
75-79	1,511	16.57
80-84	1,243	17.89
85-94	1,704	24.53
95+	180	2.59
Gender		
Female	4,405	63.41
Male	2,541	36.58
Unknown	1	0.01
Chronic Diseases		
Alzheimer's	130	1.87
Congestive Heart Failure	737	10.61
Cardiac	632	9.10
Diabetes	949	13.66
Hypertension	1,075	15.47
Pulmonary	561	8.08
Other	2,863	41.21
Hospitalization		
Once	823	11.88
More than once	106	1.53

Table 2 presents similar data on the number of observations and percentage distribution for the TM group only. There are 1,560 episodes in the TM group. The largest age group is 75-84 (16.54% for 75-79 and 20.19% for 80-84) and more than 60% of patients are female. For the chronic disease category, other than the OTHER (23.27%) category, the order from the largest to the smallest disease groups is congestive heart failure (21.6%), hypertension (15%), cardiac diseases (13.78%), diabetes (12.82%), pulmonary (12.76%), and Alzheimer's (0.77%). There are 98 (6.28%) patients who experienced hospitalization and six of them were hospitalized twice during the first episode.

Table 3 presents similar data on the number of observations and percentage distribution for the non-TM group only. There are 5,387 observations in this group. The largest age group is 75-84 (16.58% for 75-79 and 17.23% for 80-84), which is similar to the TM group. More than 60% of patients are female. For the chronic disease category, other than OTHER (46.41%) category, the order from the largest to the smallest disease groups is slightly different from the one in the TM group. They are hypertension (15.61%), diabetes (13.90%), cardiac diseases (7.74%), congestive heart failure (7.43%), pulmonary (6.72%), and Alzheimer's (2.19%). There are 725 (13.46%) patients who experienced hospitalizations and

106 of them at least experienced more than one hospitalization in the first episode during the study year.

Table 4 provides the number of observations experiencing hospitalizations for each category of chronic disease between the TM and non-TM groups. Hospitalizations I, II, and III refer to patients who were hospitalized one, two, and three times, respectively, during the first episode. In general, the non-TM group has a higher hospitalization rate than the TM group.

Table 2. Distribution of Age, Gender, and Chronic Diseases for TM Group

	Number of observations	Percentage
Age		
<65	183	11.73
65-74	370	23.72
75-79	258	16.54
80-84	315	20.19
85-94	404	25.90
95+	30	1.92
Gender		
Female	1,006	64.49
Male	554	35.51
Chronic Diseases		
Alzheimer's	12	0.77
Congestive Heart Failure	337	21.60
Cardiac	215	13.78
Diabetes	200	12.82
Hypertension	234	15.00
Pulmonary	199	12.67
Other	363	23.27
Hospitalization		
Once	98	6.28
More than once	6	0.38

Table 3. Distribution of Age, Gender, and Chronic Diseases for non-TM Group

	Number of observations	Percentage
Age		
<65	775	14.39
65-74	1,341	24.89
75-79	893	16.58
80-84	928	17.23
85-94	1,300	24.13
95+	150	2.78
Gender		
Female	3,399	63.10
Male	1,987	36.89
Unknown	1	0.02
Chronic Diseases		
Alzheimer's	118	2.19
Congestive Heart Failure	400	7.43
Cardiac	417	7.74
Diabetes	749	13.90
Hypertension	841	15.61
Pulmonary	362	6.72
Other	2,500	46.41
Hospitalization		
Once	725	13.46
More than once	106	1.97

Table 4. Distribution of Hospitalization Rates by Chronic Disease Category and TM/ non-TM Group

	Number of observations		Hospitalization I		Hospitalization II		Hospitalization III	
	TM	NonTM	TM	NonTM	TM	NonTM	TM	NonTM
Alzheimer's	12	118	2	20	0	7	0	0
Congestive Heart Failure	337	400	32	70	3	7	0	1
Cardiac	215	417	12	44	0	6	0	0
Diabetes	200	749	8	121	2	14	0	1
Hypertension	234	841	14	76	1	14	0	0
Pulmonary	199	362	11	65	0	8	0	0
Other	363	2,500	19	329	0	44	0	4
Total (Percentage)	1,560	5,387	98 (6.28%)	725 (13.46%)	6 (0.38%)	100 (2.04%)	0 (0%)	6 (0.11%)

Statistical Analysis

A telemonitor is a device that is placed at each patient's home that provides real-time, assessment of the patient's health condition to the HHP clinical care team. The telemonitor reminds patients to check their clinical conditions such as vital signs and body weight at least once per day and directly sends the results to the information technology center at HHP, where clinical specialists directly monitor the results. This system helps clinical care teams at HHP to provide early intervention when unexpected conditions happen or when the health condition of patients deteriorates; thus, TM potentially can reduce hospitalization rates if used effectively. Given this, we assume that patients who are TM users are less likely to experience hospitalizations than patients who are non-TM users. The SPH research team conducted a t-test to examine this assumption and found that the hospitalization rate for the TM users is significantly lower than the hospitalization rate for the non-TM users ($t=7.61$, $p<0.001$).

Additionally, the case mix weight represents the predicted resource consumption and expected cost for each patient. The higher the case mix weight, the higher the resource consumption for patient care. The average case mix weight in the TM and non-TM groups is 1.8082 and 1.5946, respectively, with the average case mix weight in the TM group being 13% higher than the one in the non-TM group. This difference in the average case mix weight is statistically significant ($t=8.93$, $p<0.001$).

Conclusion and Recommendations

The validation analysis presented above found that the HHP episode of care data is correct and that the hospitalization rates reported by HHP are reliable. Hospitalization rates, reported using the data transformed from Excel to SAS, have been verified and they are accurate. The data validated includes the period from November 1, 2008 to December 31, 2009, and the sample included patients whose date for start of care (episode) was on or later than November 1, 2008 and whose date for end of episode was no later than December 31, 2009.

The SPH Team used the SAS program to summarize the number of observations for different chronic disease groups in the TM and non-TM groups. The results obtained were exactly the same as the results estimated and reported by HHP.

Several important recommendations can be derived from the initial analysis of the data as they relate to data collection and subsequent analysis.

1. Approximately 40% of all the patient episodes are grouped into an OTHER category. It would be useful to obtain more information on this category (e.g., which diagnosis represents the largest chronic disease within this group).
2. The age group ranges are not even. For example, the range is 10 for age group 65-74 and 85-94 but is only 5 for age group 75-79 and 80-84. The SPH research team recommends the use of uniform age group ranges to facilitate comparison across these age groups.

At the data validation stage, the SPH research team only focused on the chronic diseases and did not analyze the distribution of the primary diagnosis (e.g., some primary diagnoses are acute conditions such as aftercare joint replacement). Further comparison of the hospitalization rate among different primary diagnoses is necessary.

3. The distribution of chronic disease in the TM and non-TM group is slightly different. Further information would be required to assess whether or not the criteria utilized to classify patients into the TM or non-TM groups lead to any substantial or significant biases, which could impact the development and outcomes of the predictive model. A review of the criteria for the assignment of patients into the TM and non-TM groups is recommended.
4. The results from a simple t test indicate that the hospitalization rate in the TM group is lower than the hospitalization rate in the non-TM group. However, the case mix weight in the TM group is higher than the one in the non-TM group. Further investigation taking patient risk factors into account to compare these two groups is recommended.

Supporting Documentation

Home Healthcare Partners Fact and Process Sheet

Systems:	**Lifestream** (Honeywell):	Tele-monitoring system and EMR
	Patron:	Billing system, houses the OASIS data
	Patron Episode Master:	Compares patient assessment data from OASIS document to assure continuity of answers with consistent information.
	Portal:	Clinical staff uses digital pens for patient notes. Information is pulled from Patron and matched up with information from the digital pen and LIfestream.
Data Repository:	**Cube:**	Updated hourly Patient social security number links records Aggregates patient data from Lifestream & Patron Contains data elements from all systems. Data is then exported to Excel or Access for analysis

Definitions:

Tele-Monitored:	If the patient is monitored from 1 day to 30 days, in a 30-day period, they are considered monitored. The question is the "intent to treat". Also, it does not matter when the monitoring equipment is delivered and installed, patient is considered monitored. This rule has been applied within the Cube analysis. Data set choice now indicates yes or no.
Fact Episode:	Unique number tied to patient episode of care (60 days), which will change with each new episode.
Episode of care:	Sixty days per CMS billing rules
Admission data:	For each patient includes admit date to discharge with possibility for multiple episodes
Patient Code:	Patient identification number or medical record number. When a patient is discharged and requires a new admission, a new patient code will be generated. Patron assigns the Patient Code, which will reference prior admission data.
Patient SS #:	Used as the link between systems, Patron and Lifestream. Lifestream does not assign a Medical Record Number (MRN).
SOE:	Start of episode
Start of Care:	Admission date
EOE:	Scheduled episode end date
End of Episode:	Actual date of end of episode

	Note: if the patient is in the hospital when the episode ends, they must be discharged from service. Episodes are concurrent. If not, rules require a discharge, then a readmission.
LUPA:	Low utilization payment amount (rate). Occurs when patients are not able to receive 5 skilled nursing visits within the episode, the agency is reimbursed on a per visit basis, at a reduced rate. Medicare episode rate reimbursement averages $2800 for all the care provided, nursing, aides, and therapy.
Early:	First two episodes
Late:	Last episodes
R/U:	Rural/ Urban
EOE Bill:	Bill for the episode. Fee schedule is set to bill for the reimbursement rate, which keeps receivables low and accurate.
SN:	Number of skilled nursing visits
HA:	Number of home health aide visits
Therapy:	Number of physical therapy visits Can also be broken out in other categories such as: OT, speech, and social worker visits.
OASIS:	CMS standardized assessment document for home health care There are several formats of the document. Initial Assessment Resumption of Care (ROC): New assessment set If a ROC exists, patient had a hospitalization.

Timeline for the Project

Time Period	5/17-5/30	5/30-6/15	6/16-6/30	7/1/-7/15	7/16-7/31	8/1-/8/15	8/15-8/30
I. Prepare data							
identify variables and manage data into analyzable database based on the top five diseases at HHP	---						
identify variables and manage data into analyzable database based on the top five diseases from CMS database		---					
II. Data Analysis: Descriptive							
descriptive analysis for re-hospitalization rate between telehealth and non-telehealth for the top five diseases individually			--				
Classify each TeleHealth patient by: 1)Case Mix Weight, 2) Top 5 disease categories, 3)Rural/Urban Setting, 4)Age, 5)Gender, 6)Income Bracket, 7) # of Nursing & Therapy Visits at HHP			--				
III. Data Analysis: Multivariate analysis							
Identify patient risk factors for re-hospitalization for all patients for top five diseases individually at HHP				--			
Evaluate the effect of telehealth on the frequency of re-hospitalization for top five diseases individually at HHP					--		
Evaluate the difference in re-hospitalization rate for all Medicare patients between HHP and CMS for top five diseases individually						--	
Wrap the results							--

Biographical Information

Georgia Brown, BS, RRT serves as Senior Vice President for HHP. Ms Brown joined HHP in 2004 and brings very diverse management expertise with a clinical and financial focus. She has 17 years of Home Health Management experience including financial modeling and analysis, financial due diligence, program development, billing and collections, and quality improvement. Georgia is the developer and leader of VitalPartners 365™ - HHP's telemonitoring program. VitalPartners 365™ is considered one of the top telemonitoring programs in the nation demonstrating a significant reduction in rehospitalization for chronically ill home health patients. Georgia also has oversight responsibility for the Clinical Initiatives and Comprehensive Care Programs. These programs are positioning HHP to be a leader in clinical technology and therapy services.

Stacey Brown, RN serves a Director of the Vital Station enterprise of HHP. Ms Brown has over 11 years experience in nursing with a large focus in cardiac critical care. She has worked as a charge nurse in large CCU/CVICU settings for over 6 years, where she was instrumental in beginning a cardiac surgery program. Stacey's experience also includes home health nursing for the last 4 years. She has spent the last 3 ½ years at HHP as a Branch Manager and then as a Regional Manager. The combination of acute critical care experience coupled with the chronic disease management of home health prepared her well for the position she currently holds. Stacey is currently pursing a Master's Degree in Nursing.

Kim Wong, Financial and Statistical Analyst, joined HHP in June, 2008. She brought with her over 10 years of financial analysis and accounting experience with companies such as Dell Computing and ORIX USA. In her 2 years with HHP, Kim has been immersed in data analysis and support for the HHP data warehouse. She is very involved in developing operational tools for utilization by field office management. Her most outstanding achievement has been developing the process for outcomes data management. Kim holds a BS in Finance.

Hsueh-Fen Chen, PhD is an Assistant Professor in the Department of Health Management and Policy at the University of North Texas Health Science Center School of Public Health. She received her PhD in Health Services Research and Organization from the Virginia Commonwealth University. Her primary research interests are hospital finance, quality of care, and access to care. She has participated in two funded projects under Dr. Gloria J. Bazzoli at the Virginia Commonwealth University. These two projects are: Hospital Finances and the Quality of Hospital Care funded by the Agency for Healthcare Research and Quality (AHRQ), and Safety Net Hospitals and Minority Access to Health Care funded by the National Institutes of Health (National Heart, Lung and Blood Institute). Through participating in these two projects, Dr. Chen obtained significant research experience extracting information and analyzing patient level data and has many years of experience working with national health and demographic databases, including the Area Resource File, the American Hospital Association Annual Survey, the hospital cost reports from the Centers for Medicare and Medicaid Services, and the Medicaid Statistical Information System. Dr. Chen has published her studies in peer-reviewed journals such as *Medical Care, Health Economics* and *Medical Care Research and Review and* has received a national award, the 2007 Most Outstanding Abstract for the Health Care Markets and Financing Section at the 21th Annual Research Meeting of Academy Health in Orlando, FL.

José A. Pagán, PhD is Chair and Professor of Health Management and Policy at the University of North Texas Health Science Center School of Public Health. He is also Adjunct Senior Fellow at the Leonard Davis Institute of Health Economics at the University of Pennsylvania. He received B.S. and M.A. degrees in mathematics and economics from The Ohio State University, and a Ph.D. in economics from The University of New Mexico. His research focuses on the population health consequences and community effects of uninsurance, and the impact of health status on employment and productivity. His research interests also include the economics of immigration and immigrant health. He has been a Fulbright Scholar in Mexico, a consultant for the World Bank and the Inter American Conference on Social Security, Director of the UTPA Center for Border Economic Studies, and a Robert Wood Johnson Health and Society Scholar at the University of Pennsylvania (Cohort 1, 2003-2005). In 2007 he and Dominick Frosch (UCLA School of Medicine) received a Robert Wood Johnson Foundation Investigator Award in Health Policy Research to study the effects of direct-to-consumer advertising of prescription drugs on health behaviors.

M. Christine "Chris" Kalish, MBA, CMPE is President of The Brittain-Kalish Group, LLC and adjunct Associate Professor in Health Management and Policy at the UNT Health Science Center School of Public Health. She is a healthcare management consultant, with expertise in strategy, revenue cycle and ambulatory operations. Prior to forming BKG, she served as vice president and chief transformation officer for UNT Health, the clinical enterprise for the UNT Health Science Center at Fort Worth. She led strategic planning efforts, process improvement projects and business assessments in all areas of the clinical practice, as well as developing business opportunities within the community. Before joining UNT Health, Chris served as vice president and chief of staff, providing primary strategic and tactical support for the president of the UNT Health Science Center. She has also served in leadership positions at UT Southwestern (UTSW) Medical Center in Dallas. While she was completing her MBA, she worked as a special project manager for the Department of Radiology. She also served as the Chief Financial Officer for the UTSW Cancer Center. Chris holds a Bachelor of Science in Health Services Administration from UT Southwestern Medical Center's Allied Health Sciences School and an MBA from Texas Christian University. She is a Certified Medical Practice Executive through the Medical Group Management Association and holds a certificate in Business Process Analysis.

Contact Information:
Home Healthcare Partners, LLC
3406 Main Street
Dallas, Texas 75226

Wayne Bazzle
wbazzle@homehealthcarepartners.com
Georgia Brown
gbrown@homehealthcarepartners.com

Department of Health Management and Policy
School of Public Health
University of North Texas Health Science Center
3700 Camp Bowie Blvd.
Fort Worth, Texas 76107

Hsueh-Fen Chen, PhD
Hsueh-fen.chen@unthsc.edu
José A. Pagán, PhD
Jose.pagan@unthsc.edu

The Brittain- Kalish Group, LLC
4724 Lake Havasu Trail
Fort Worth, Texas 76103

M. Christine Kalish, MBA, CMPE
mckalish13@gmail.com
Barbara J. Brittain
kabrit1@sbcglobal.net