

The Telehealth Solution



HOME HEALTHCARE PARTNERS

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➤ Company Overview

Home Healthcare Partners (HHP) is a home healthcare and Telehealth company with a chronic disease management focus. Based in Dallas, Texas, and founded in 2003, HHP serves the needs of patients throughout Louisiana and much of Texas. HHP began its Telehealth specialty in April 2006 in order to provide superior care to chronically ill patients. This Telehealth service, **VitalPartners 365[®]** (VP365SM), now provides daily Telehealth care to more than 2000 patients, about 55% of HHP's Medicare census, making it one of the largest homecare sponsored Telehealth services in the United States. The program is expected to increase the number of patients on its service to about 3500 by calendar year end 2011, which will then represent about 90% of HHP's Medicare patient census.

Telehealth hardware provides the capability for monitoring blood pressure, heart rate, weight, oxygen saturation levels and accommodates optional glucometer and peak flow meter attachments. HHP developed proprietary software systems with the capacity to generate detailed patient hospitalization information. Company management believes this system is unique within the home healthcare industry and contributes to a significant reduction in rehospitalization rates for HHP Telehealth patients. Since 100% of HHP's patients receive home healthcare services, it is logical to assume that such patients are more seriously ill than the average Medicare patient discharged from a hospital, only 8.9% of whom are diagnosed by a physician as needing homecare services. Nevertheless, the company's 30 day hospitalization rate for its Telehealth patients is 7.6% or more than 61% lower than the average readmission rate for all Medicare beneficiaries discharged from a hospital.

30 – Day Rehospitalization Rates	
Medicare Beneficiaries – US Average	19.6 %
Texas Medicare Beneficiaries	19.4 %
Louisiana Medicare Beneficiaries	21.3 %
Home Healthcare Partners – Non-Telehealth	16.1 %
VitalPartners 365 - Telehealth	7.6 %

While the first savings target of opportunity is avoidable hospital readmissions, total admissions represent a far larger savings potential. Based on Medicare data, the average cost per hospital stay for all of 2009 was \$9,485 and admissions totaled 10,749,247. Thus, hospital inpatient costs for Medicare Fee-for-Service patient, not including Medicare Advantage plans or Medicaid program expenses, totaled \$ 102,124,599,484. It should be noted that average inpatient costs during the first quarter of 2010 increased more than 3% to \$9,783. Given that the chronically ill account for more than 84% of all health care spending, the long term opportunity for cost savings is far greater than savings to be generated through reducing hospital readmissions alone.

Currently, more than 80% of HHP's revenue is derived from Medicare home healthcare services provided to its Fee-for-Service patients. It is important to note that Medicare provides no additional reimbursement when Telehealth services are added to traditional homecare services provided by field clinicians. More than 23,000 sixty day episodes of Telehealth care have been completed since program

inception. Because this service is provided every day of the year including weekends and holidays, HHP tracks **patient days** of service which now exceed 1,100,000. Management believes this rich reservoir of data can be used to develop models that will predict the likelihood of a patient's return to a hospital with a high degree of precision. The goal of this project is to develop tools that provide targeted, efficient and cost effective Telehealth service delivery. This project, undertaken by biostatisticians who are members of The University of Texas Health Science Center facility, is well underway.

➤ **Texas and Louisiana Health Profile**

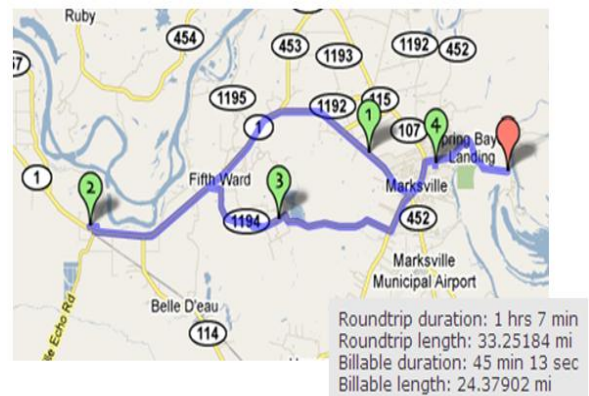
HHP patients live in two states that might well be described as the epicenter of “Chronic Disease America”. Comparing their health profile to all states, Texas scores 39th and Louisiana 47th. They have the same ranking for **Preventable Hospitalizations**. Texas and Louisiana rank in 22nd and 46th place, respectively, for the prevalence of cardiac disease, 27th and 46th for hypertension, and 40th and 47th for diabetes. Making these statistics even more sobering is the percentage of uninsured in each state. Texas has the highest percentage of people without health insurance of all states: 50th place, a position it has held for years and Louisiana in 47th place has similar issues.

With about 27% of its population uninsured, approximately 6.1 million of the people living in Texas have no health care coverage. This number exceeds the population of 33 states. What is the impact of people without health care coverage? Upon becoming Medicare eligible, the formerly uninsured group has 13% more physician appointments, is hospitalized 20% more often and generates 51% more medical expenditures than does the group of newly eligible Medicare beneficiaries who had healthcare insurance prior to turning 65. These are the specific facts that led HHP to initiate its Telehealth service in 2006. This is the population which needs these services most and offers the best opportunity for perfecting a Telehealth service.

➤ **Proprietary Systems**

Key to the company's success is its Data Warehouse (CUBE) which collects data hourly from HHP's clinical, Telehealth and accounting systems. The CUBE is designed specifically and exclusively for rapid, accurate data analysis rather than for the completion of transactions. Reports can be designed in five to ten minutes, automatically updated hourly and are available at all times to all management. The CUBE provides information used by management to follow and understand the myriad operating relationships developed by its complex operations and to generate “what if” scenarios as changes in operations are being considered.

The efficient delivery and installation of monitoring hardware, coupled with instructing patients in its use, are important components of any Telehealth service. A team of **Telehealth Field Coaches** provide these services. HHP developed a training DVD to assure that all Field Coaches use the same techniques for equipment set up and patient training. A **Routing, Mapping and Standardized Mileage** system, also developed by HHP, interfaces with Google Maps to generate optimal routes with printed maps and driving instructions. In addition, it calculates mileage for each route, providing an accurate basis for mileage reimbursement.



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➤ **HHP Plans for a National Telehealth Program**

Management plans to expand its Telehealth service beyond its Texas/Louisiana footprint. The clinical component of its VP 365SM service can provide Telehealth services to patients, no matter where they may be in the nation. HHP has developed the training tools, intake documents, data base and patient disease management information required for the successful offering of this service. The primary target for this service includes the more than 12,000,000 Medicare beneficiaries who are admitted to a hospital annually. Almost one in five of these patients will return to a hospital within the first thirty days following their discharge from a hospital. Medicare believes that it absorbs at least \$17 billion of annual expenses resulting from preventable hospitalizations. These are the types of patients with which HHP has its greatest experience. Additionally, discussions with hospitals and Medicare and Medicaid Managed Care organizations are now underway.

VP 365SM expects to partner with those hospital systems, managed care, disease management, assisted living, and physician house call organizations that can directly benefit from cost savings derived by reducing preventable hospital admissions.

➤ **Key Components of a Successful Telehealth Service**

It is important to understand that the success of a Telehealth service depends primarily on the effectiveness of its clinical component. While there are a number of Telehealth monitors available, some better than others, they serve principally as devices for data transmission. Capturing all important information in a system that provides rapid, accurate analysis is essential to effective management of the program and program patients. The ability of seasoned clinicians with critical care experience to “coach” patients regarding the nature of their health issues, their medication and their nutritional management needs is the heart of a successful Telehealth program. Developing a team of such clinicians along with program support systems is time consuming and expensive. The reasons that HHP requires case managers to have had critical care experience are those characteristics listed below.

- Confident assessment skills-if a clinician is not confident in their assessment, they cannot be confident in their intervention.
- Confident in medication knowledge and interaction
- Calm under pressure
- Patient Advocates with all members of the patient’s healthcare team
- Experience in handling life threatening emergencies

Clinicians having these characteristics seek to prevent patient hospitalizations without the intervention of field-based clinicians, whenever possible. However, they must also be confident enough in their judgments to call upon the help of healthcare team members when necessary; and to direct their patient to the hospital when warranted by the patient’s condition.

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Traditional Telehealth as a Home Healthcare Service Component--In traditional home care models, telehealth is a spoke in the agency's patient care system. It is seen as another service, not a standard of care. This service is generally made available when requested by patient care givers. This model might be viewed as follows.



Telehealth as Intervention Center—The VP 365 telehealth model establishes as the center for “Case Managing” all of the telehealth patient’s care. Because these patients are being tracked on a daily basis, Vital Station clinicians are in the best position to order needed care. Nursing and therapy visits are targeted according to need and not simply scheduled in accordance with an assessment of the patient’s needs upon their admission. With telehealth, the patient’s health needs assessment is dynamic and therefore subject to change daily and sometimes several times in a single day. This frequent flow of information and frequent patient contact positions the Vital Station to be the coordinator of all of its patients’ care as shown in the following diagram.



HHP’s CUBE makes it possible to “benchmark” the Telehealth services it provides so that any organization whose patients are served by VP 365 can compare patient outcomes to the outcomes of patients not receiving services of this type. Reporting measures may be customized but will likely include patient age, gender, race, income level, hospital, physician, reason for hospitalization, disease category, referral source, urban or rural location, and patient satisfaction. Over time, best practices for each type of patient can be developed so that continual reductions in healthcare costs may be achieved. Examples of the company’s Telehealth data analysis using the company’s actual information will be seen later in this paper.

➤ **Telehealth Internal Benchmarking**

HHP has developed a procedure to objectively compare the hospitalization rates of Telehealth patients to those of its patients who are not part of the Telehealth program. In order to do this certain rules were established:

- Patients are admitted to the Telehealth program based on risk of hospitalization rather than diagnosis.
- Hospitalizations of Telehealth patients are counted even if the patient had been monitored for only one day when hospitalized.
- Telehealth patient episodes are ranked by Case Mix Weight (CMW), highest to lowest. CMW is developed from a coding system created by Medicare to measure patient health and environmental conditions. Higher scores indicate that a patient's condition requires more intense care than patients with lower scores.
 - These episodes (generally sixty days long) are divided into four groups that are equal by number of patients, and the average CMW of each group is calculated.
 - Non Telehealth patient episodes are placed into four groups having exactly the same average CMW as comparison Telehealth groups without regard to the number of episodes that fall into any single group.
 - Telehealth and non-Telehealth episodes having the same average CMW are compared.
- All hospitalizations are counted without regard to the reason for the readmission. Patients rehospitalized for a scheduled procedure, a dog bite or burns suffered while cooking are counted along with patients hospitalized due to an exacerbation of their principal health condition.
- Contraindications for Telehealth are level four heart failure patients, hospice candidates, patients who cannot manage the telehealth equipment by themselves and have no caregiver at home to help them, and those who suffer from severe psychiatric disorders.

Unless otherwise indicated, the following schedules compare only patients' first 60 days of care following admission to HHP's service. All patients have been admitted by one of HHP's service offices using the same admissions procedures, and episode coding which develops the CMW is performed by the company's centralized coding department. The raw data which was the basis of this report has been submitted to biostatisticians who are members of the faculty of The University of North Texas Health Science Center (UNTHSC) for review and validation. This review has now been completed and results determined by HHP were validated. As mentioned earlier in this paper, UNTHSC is now undertaking a project which uses this data combined with all data generated in 2010 through 2011 to develop algorithms designed to predict the likelihood of a patient's return to the hospital.

Data shown below was developed from episodes completed during the twelve months ending September 2009.

➤ **Schedule 1-- Case Mix Weight Comparison**

This analysis was expected to show that fewer patients with lower CMW would need Telehealth services than those with higher scores. This was not found to be the case for reasons that have since been identified. It is clear, however, that far more patients will benefit from Telehealth services than was first assumed. This knowledge led to the decision to at least double the number of HHP Telehealth patients.

1 st Episode Only					
Case Mix Category	Telehealth Episodes	Hosp % Telehealth	Non - Telehealth Episodes	Hosp % Non-Telehealth	Difference
Case Mix Cat 1	791	11.1%	1219	15.8%	- 29.7%
Case Mix Cat 2	791	13.3%	1544	19.0%	- 30.3%
Case Mix Cat 3	791	20.0%	2056	29.1%	- 31.4%
Case Mix Cat 4	793	12.6%	2586	27.1%	- 53.4%
Grand Total	3166	14.2%	7405	24.1%	- 40.9%

➤ **Schedule 2—Comparison of Patients by Disease Category**

Diabetic patients (except for the small Alzheimer’s group) realize the greatest benefit from Telehealth of all chronic disease categories but all benefit materially. The “Other” category includes patients with a wide array of health issues which the company periodically reviews to determine if separate categories should be established.

Hospitalization Rate for 1 st Episodes					
Chronic Disease	Telehealth Episodes	Hosp % Telehealth	Non - Telehealth Episodes	Hosp % Non-Telehealth	Difference
Alzheimer’s	7	0.0%	65	13.8%	-100.0%
Cardiac	663	13.4%	1555	24.1%	-44.2%
CHF	973	20.7%	1083	34.8%	-40.7%
Diabetes	330	7.9%	1022	24.5%	-67.8%
Hypertension	472	10.0%	1679	18.3%	-45.7%
Other	96	8.3%	871	18.6%	-55.2%
Pulmonary	625	12.8%	1131	27.1%	-52.7%
Total	3166	14.2%	7406	24.1%	-40.9%

➤ **Schedule 3—Urban/Rural comparison**

The hospitalization rate of non-Telehealth rural patients is almost 80% higher than that of rural Telehealth patients. Telehealth services positively impact both groups significantly but rural patients, who generally have more limited access to healthcare services than those in urban areas, respond best.

Telehealth (Rural and Urban)				Non-Telehealth (Rural and Urban)			
Case Mix Category	Rural	Urban	Grand Total	Case Mix Category	Rural	Urban	Grand Total
Case Mix Cat 1	11.4%	11.0%	11.1%	Case Mix Cat 1	14.1%	17.0%	15.8%
Case Mix Cat 2	12.2%	14.1%	13.3%	Case Mix Cat 2	20.8%	17.7%	19.0%
Case Mix Cat 3	21.1%	19.0%	20.0%	Case Mix Cat 3	32.2%	26.5%	29.1%
Case Mix Cat 4	11.5%	13.7%	12.6%	Case Mix Cat 4	28.4%	26.0%	27.1%
Grand Total	14.3%	14.2%	14.2%	Grand Total	25.7%	22.8%	24.1%

➤ **Schedule 4—Age Group Comparison**

Under age 65 Medicare patients, about 12.6% of the total, have healthcare issues that are not reasonably comparable to the over 65 group and, monitored or not, they return to the hospital more often than older patients. However, when a part of the telehealth program, rehospitalizations of these patients are reduced by almost 47%. Interestingly, the largest rehospitalization percentage reduction is achieved for the oldest category of patients. These patients are among the most determined to remain at home, avoiding hospitalization where possible.

1 st Episode Only - Telehealth (Age Groups)							
Case Mix Category	< 65	65 – 74	75 – 79	80 – 84	85 – 94	95 +	Grand Total
Case Mix Cat 1	10.2%	10.5%	11.4%	10.5%	12.1%	13.0%	11.1%
Case Mix Cat 2	13.3%	12.9%	15.9%	13.9%	11.2%	16.7%	13.3%
Case Mix Cat 3	17.3%	21.8%	22.3%	19.3%	18.2%	22.2%	20.0%
Case Mix Cat 4	16.3%	12.4%	11.0%	10.2%	14.3%	0.0%	12.6%
Grand Total	15.0%	14.7%	14.9%	13.3%	14.0%	12.1%	14.2%

1 st Episode Only – Non-Telehealth (Age Groups)							
Case Mix Category	< 65	65 – 74	75 – 79	80 – 84	85 – 94	95 +	Grand Total
Case Mix Cat 1	17.4%	15.0%	18.4%	14.6%	15.3%	18.2%	15.8%
Case Mix Cat 2	16.7%	21.7%	16.8%	21.0%	18.9%	8.3%	19.0%
Case Mix Cat 3	30.7%	29.3%	31.4%	30.5%	24.3%	33.9%	29.1%
Case Mix Cat 4	32.1%	27.1%	23.3%	25.0%	26.8%	27.3%	27.1%
Grand Total	28.1%	24.7%	23.5%	23.7%	21.8%	23.2%	24.1%

➤ **Schedule 5—Male/Female Comparison**

Males return to the hospital more often than females, and Telehealth services have a significant impact on both. Females in the highest telehealth case mix group return to the hospital least of all while males in the lowest, telehealth case mix group four, achieve the lowest rate of rehospitalization of the four male groups. This group of males achieved the greatest improvement, 64% reduction, when compared to the hospitalization rate of their non-monitored counterparts.

Telehealth (Gender)				Non-Telehealth (Gender)			
Case Mix Category	Female	Male	Grand Total	Case Mix Category	Female	Male	Grand Total
Case Mix Cat 1	10.4%	12.3%	11.1%	Case Mix Cat 1	15.5%	16.4%	15.8%
Case Mix Cat 2	13.4%	13.1%	13.3%	Case Mix Cat 2	19.0%	19.0%	19.0%
Case Mix Cat 3	19.3%	21.2%	20.0%	Case Mix Cat 3	30.3%	27.3%	29.1%
Case Mix Cat 4	13.5%	11.0%	12.6%	Case Mix Cat 4	24.4%	30.8%	27.1%
Grand Total	14.1%	14.4%	14.2%	Grand Total	23.3%	25.6%	24.1%

➤ **Schedule 6—Income Level Comparisons—All Episodes**

Patients are assigned income levels based on their zip code and published income information obtained from census data. “All” episodes rather than first episode data was used so that the under \$15,000 category would be large enough to be relevant. This income level group is generally the most disadvantaged in terms of financial resources, education and access to healthcare services. Of all groups, many have thought the very low income group to be the least likely to respond to a Telehealth program which places heavy emphasis on behavior modification. Interestingly, all of HHP’s patients in this category, Telehealth or not, live in one Louisiana parish which was among those most ravaged by Katrina. While admittedly a small sample, results create hope that these low income patients may be effectively cared for through Telehealth programs as are all other income groups, reversing the assumptions of many.

Income Level	Income Brackets				
	Telehealth		Non-Telehealth		Reduction
	Episodes	Hosp Rate	Episodes	Hosp Rate	
Less than \$15,000	96	10.4%	243	18.5%	-43.8%
\$15,000 – 34,999	970	10.9%	2106	15.6%	-29.8%
\$35,000 – 49,999	2323	9.8%	4874	18.7%	-47.5%
\$50,000 – 74,999	4721	11.7%	10022	18.9%	-38.0%
\$75,000 and up	1844	11.9%	4331	18.8%	-37.0%

The above schedules make it apparent that far more is to be learned through in depth data mining. We care for individual patients, not groups. Developing predictive models should lead to more effective and targeted care. When this objective has been realized, developing models that adjust for regional differences is HHP’s next goal.