

# **Home Health Outcomes in a CHF Population: A Study of Patients on Telehealth vs. Patients Not on Telehealth**

## **I. Background**

Telemonitoring has been part of home health care for some years. There is anecdotal evidence of the health care benefits for patients and the financial benefits for agencies employing telemonitors, but there has been little formal study of the issue.

This paper will present a comparison of two populations of CHF patients: one group was put on telemonitors, and the other was not. We will investigate differences in:

- Hospitalizations
- Emergent care use
- Patient Satisfaction

## **II. Study Design**

**Location:** This analysis was conducted at Alegent Health Home Care and Hospice, in Omaha, NE. Alegent is a non-profit, hospital based home care agency with an average daily census of approximately 500 patients.

**Study Population and Time Frame:** The analysis includes 74 patients with a primary or secondary diagnosis of CHF (ICD-9 code 428). The patients were admitted on home health service between January 1, 2007 and September 1, 2007. The patients are divided into those on telemonitors and those receiving care without telemonitors. The patients on telemonitors were not necessarily on the devices during the entire period on home health. The analysis was conducted by Strategic Healthcare Programs, LLC.

**Assignment to Groups:** In previous studies, lack of random assignment of patients to telemonitoring vs. non-telemonitoring groups has put the reported benefits in question. In the current study, all CHF patients admitted to home care during the study period were eligible for telehealth monitoring. However, the following factors would preclude a patient from being put on a telehealth monitor:

- The patient has no phone line (has a wireless home).
- The patient is unable to use the telehealth monitor due to a physical or mental limitation such as confusion or blindness.
- The patient refuses to be on a telehealth monitor.

These assignment methods may have introduced bias into the study. Also, there were no criteria to include or exclude a patient with CHF due to severity of the disease. However, due to the limited quantity of telehealth monitors (30), sicker patients were given priority. That was determined by the nurse's assessment.

**Telemonitoring Equipment:** The patients in the telemonitoring group were monitored with the Viterion 100 model.

## **III. Results**

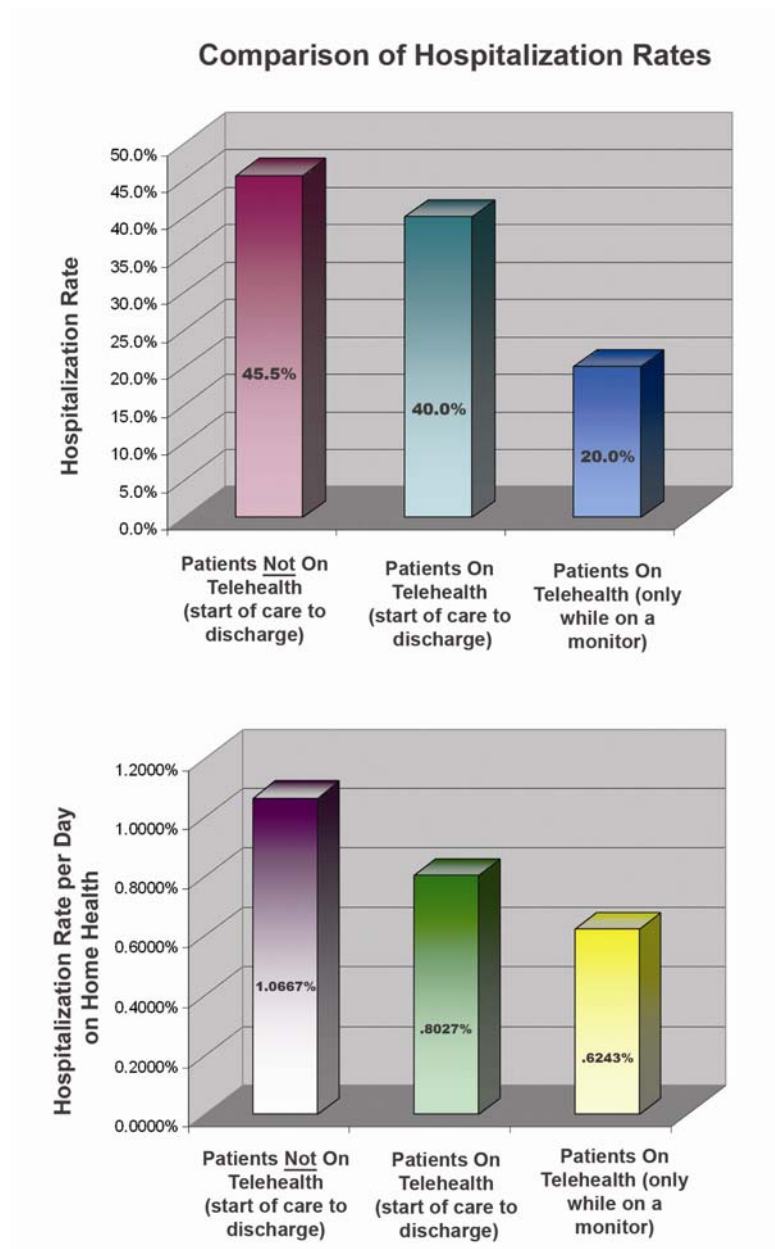
### **Hospitalization and Emergent Care:**

Hospitalization rates were measured in two ways: "hospitalization rate" (total hospitalizations divided by total number of patients), and "hospitalization rate per day on

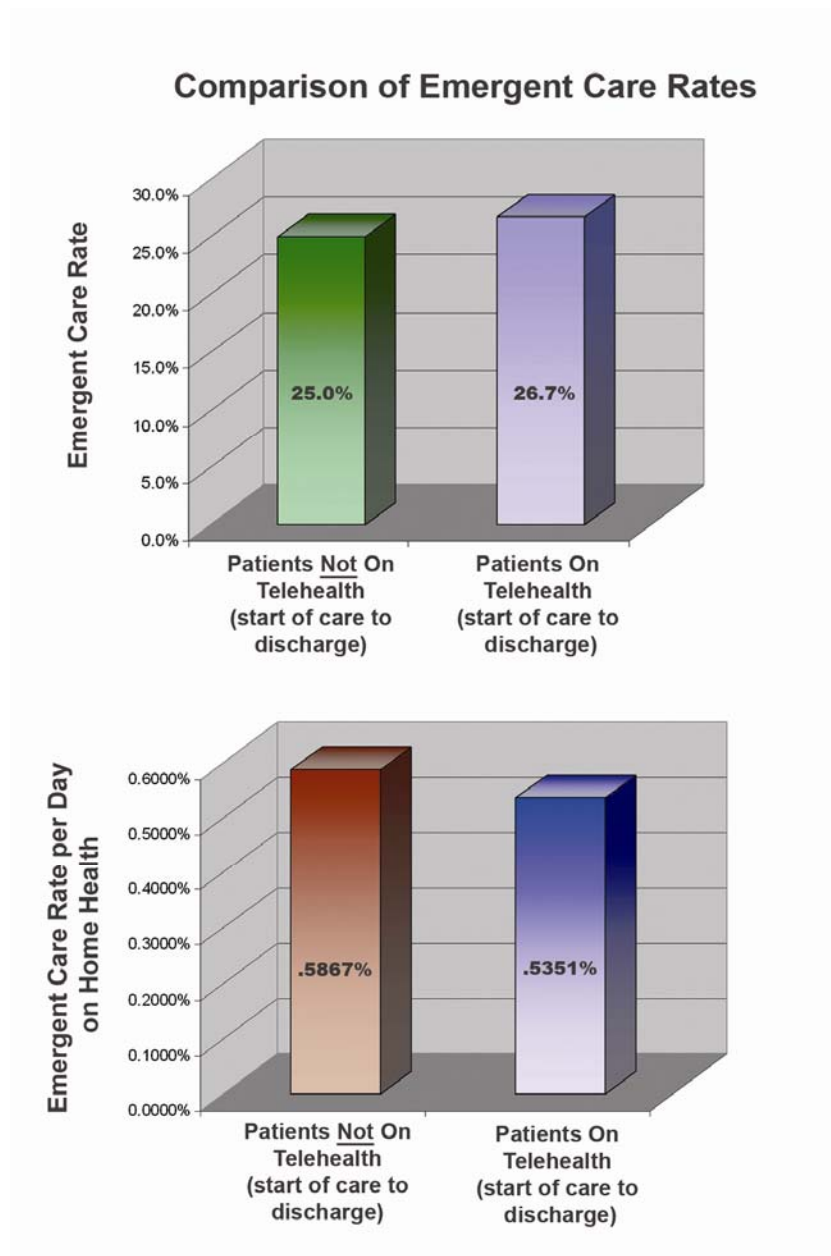
home health". The latter measure is more accurate. All else being equal, the likelihood of being hospitalized increases the longer a patient is on home health service.

When considering the entire time the patient is on home health, start of care to discharge, the group on telehealth had fewer hospitalizations than the group not on telehealth. This was true for both measures: hospitalization rate, and hospitalization rate per day on home health. The difference is even greater when measured as a rate per day on home health.

As indicated earlier, the patients on telehealth monitors are not necessarily on the monitors for the entire time from start of care to discharge. Therefore we also considered just the period of time when the telehealth patients were actually on the monitor. This may give a better picture of the impact of the telehealth technology itself. In fact, the difference in hospitalizations was even more pronounced when considering this restricted time period.



The results for patients seeking emergent care services were less dramatic. The rate for emergent care was virtually identical between the two populations, but the rate per day on home health was lower for patients on telehealth.



Note: The actual date of the emergent care visit was not available; therefore, it is not possible to show the emergent care visit rate for the patients on telehealth while they were actually on a monitor.

Refer to the Appendix for a detailed comparison of the demographics and other metrics for the two study groups.

#### **Patient Satisfaction:**

Satisfaction surveys asking the patient or the patient's family about the telemonitoring experience were sent to all patients on telehealth. The survey was sent after the monitor was discontinued.

There were 10 questions on the survey. Three were directly related to how well the patient adapted to the use of the monitor and perception of the value of telemonitors in the care process.

The following results are based on the responses in the 83 returned surveys received between January 1, 2007 and September 30, 2007. These include responses from many telehealth patients, not just those CHF patients in the current study.

- Question 1: "The Monitor was easy to use." A four point Likert scale format with options ranging from Excellent (4) to Poor (1) was used. Nearly two-thirds (63%) rated this question as "Excellent".
- Question 2: "Did the Telehealth Monitor reduce your use of other medical services such as unscheduled clinic visits, emergency room, and 911 calls?" This was a yes/no question. 71% of patients on a telehealth monitor believed that the telehealth experience had decreased their use of these other health care services.
- Question 3: "How long did it take for you to feel comfortable with the TeleHealth Monitor?" Nearly half (48%) were comfortable on day 1, and by the end of week 1, and additional 32% had achieved an acceptable level of ease with the process and equipment.

#### **IV. Conclusions and Discussion**

##### **Analysis Summary:**

Due to the design of the study and sample assignment, generalization of results is not possible. The study did find the CHF patients on telemonitors to have a lower hospitalization rate compared to those patients not on telemonitors.

The results for emergent care were not as clear, and further study and analysis is warranted.

The patient satisfaction results confirm that the elderly population and their families can handle the technology of telemonitoring well, and become comfortable with the equipment quickly, typically within one week.

##### **Assignment of Patients to Telemonitoring:**

Previous evaluations of the benefits of telemonitoring have lacked true experimental design, including randomized assignment to the study groups. This current study is no exception. However, because of the limited number of monitors available, sicker patients were often given preference to be put on telemonitors so that group could have been skewed toward poorer results.

In spite of this, the reduced hospitalization rates and positive patient feedback point to a benefit of telemonitoring. If these results can be achieved on a sicker population, it stands to reason that even greater benefits could be realized with greater use of telemonitors.

With a restricted number of monitors, the goal is to reduce hospitalization. This goal was achieved. With a greater number of monitors, the goal would be to change the disease process.

##### **What Makes a Telehealth Program Successful?**

The results above indicate the program is a success. Discussions with the staff at Alegent indicated the following factors contributed to the success.

- **Staff consistency:** Alegent had dedicated staff members assigned to the telemonitoring project. Therefore, the patients had the same people calling them, including an experienced cardiac nurse and a single dedicated aide helping the patient get used to the equipment.
- **Financial Benefits:** Monitoring saved Alegent Healthcare System money by reducing hospitalizations. Telemonitoring had a dedicated champion within the home health group, and providing information to upper management at the healthcare system was an important factor in creating an organization culture that supported telemonitoring.
- **Creating the Future:** There is clearly a gap at Alegent (and other organizations) between the number of monitors currently available and the number that could be deployed with beneficial effects. Reducing that gap while still making telemonitoring a financially viable alternative is the next challenge for Alegent Health Home Care and Hospice. For instance, the health system and the clinics are now considering strategies to have private insurance pay for telehealth. Studies such as this one are an excellent start to making practice change a reality.

## V. Appendix

### Study Statistics:

Measure	Telehealth Patients	Non-Telehealth Patients
Average Age:	81.0 years	82.1 years
Male:	37.1%	40.4%
Female:	62.9%	59.6%
Admits:	30	44
Discharges	29	44
Days on Home Health:	1,495	1,875
Average Length of Stay on Home Health:	49.8 days	42.6 days
Hospitalizations:	12	20
Hospitalization Rate:	40.0%	45.5%
Hospitalizations per Day on Home Health:	0.8027%	1.0667%
Emergent Care Visits:	8	11
Emergent Care Visit Rates:	26.7%	25.0%
Emergent Care Visits per Day on Home Health:	0.5351%	0.5867%
Average Case Weight:	1.077	1.052
Monitored Days:	961	
Average Days on Monitor:	32.0 days	
Hospitalizations While Monitored:	6	
Monitored Hospitalization Rate:	20.0%	
Hospitalizations per Day on Monitor:	0.6243%	

### VI. Acknowledgements:

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