Societal Cost and Cost to Medicare for Enhanced Monitoring Using a Computer Based Telephonic Monitoring System in Older Patients with Heart Failure: The Heart Failure Home Care Trial

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Background

- **Prior studies suggest that disease management programs may be effective in improving clinical and economic outcomes in patients with heart failure (HF). Whether these types of programs can lower healthcare cost and be adapted to the primary care setting is unknown.**

Objective

- **This study was designed to assess the impact of a home-based disease management program, the Alere DayLink HF Monitoring System (ADLHFM), on the clinical and economic outcomes of Medicare beneficiaries recently hospitalized for HF who received the care from a community based primary care practitioner.**

Methods

- **Multicenter, randomized, controlled clinical trial**
- **April 2002- September 2005**
- **315 Medicare eligible minority patients women, and non-Caucasian males (African-Americans, and Hispanics) with**
  - *** heart failure secondary to predominantly systolic dysfunction**
  - *** had been hospitalized for heart failure within six months of randomization,**
  - *** had symptoms despite optimal medical treatment**

. **Of those, 292 patients had their Medicare data available.** (cost analysis)

Methods

- A computer based telephonic heart failure monitoring system(Alere Day Link Heart Failure Monitoring System :HFMS) vs standard heart failure care (SC).
- Patients were cared for by primary care physicians in a community setting.
- The study endpoints included cardiovascular death or re-hospitalization for heart failure, length of hospital stay, total patient cost and cost to medicare at 6 months of enrollment.

Inclusion Criteria

- Medicare beneficiary
- ≥65 years of age
- discharged from hospital with a primary (DRG 127) or secondary diagnosis of heart failure within 6 months of randomization
- receiving optimal medical care consistent with recent guidelines

Exclusion Criteria

- significant symptomatic ischemic heart disease
- renal failure requiring dialysis
- serum creatinine of > 2.5
- chronic or intermittent inotropic therapy
- uncorrected primary stenotic valvular disease
- COPD with an FEV1 of less than 50%

Randomization

- 1:1 ratio ; SC vs HFMS
- SC: patient one-on one education,
  education to clinicians,
  an effort to use evidenced-based optimal medical treatment
  digital home scale with management by primary physician

Follow-up

- Patients were seen in clinic or in their primary care physician's office at baseline and 6-month visits
- telephone contact at 30 days and 3 months post-randomization by non-medical personnel masked to treatment assignment to collect clinical data

Patient Demographics

Characteristic	Standard Care n=155	HFMS n=160	p-value
Mean age (years) Range	76.0±6.8 (65 - 94)	76.9±7.1 (65 - 94)	0.29
Female (%)	60.6	68.7	0.13
Hispanic (%)	28.4	27.5	0.86
Race (%) White Black Other	 47.7 52.3 0	 57.5 41.9 0.6	0.12

Concomitant Therapy

Characteristic	Standard Care n=155	HFMS n=160	p-value
ACE inhibitor	76.8	76.2	0.91
β-Blocker	78.7	81.9	0.48
Digoxin	47.1	43.7	0.55
Diuretic	94.8	93.7	0.68
Ca channel blocker	8.4	10.6	0.50
ARB	21.3	20.6	0.88
Hydralazine	10.3	11.2	0.79
Nitrate	35.5	32.5	0.58
Anti-arrhythmic	12.3	11.9	0.92

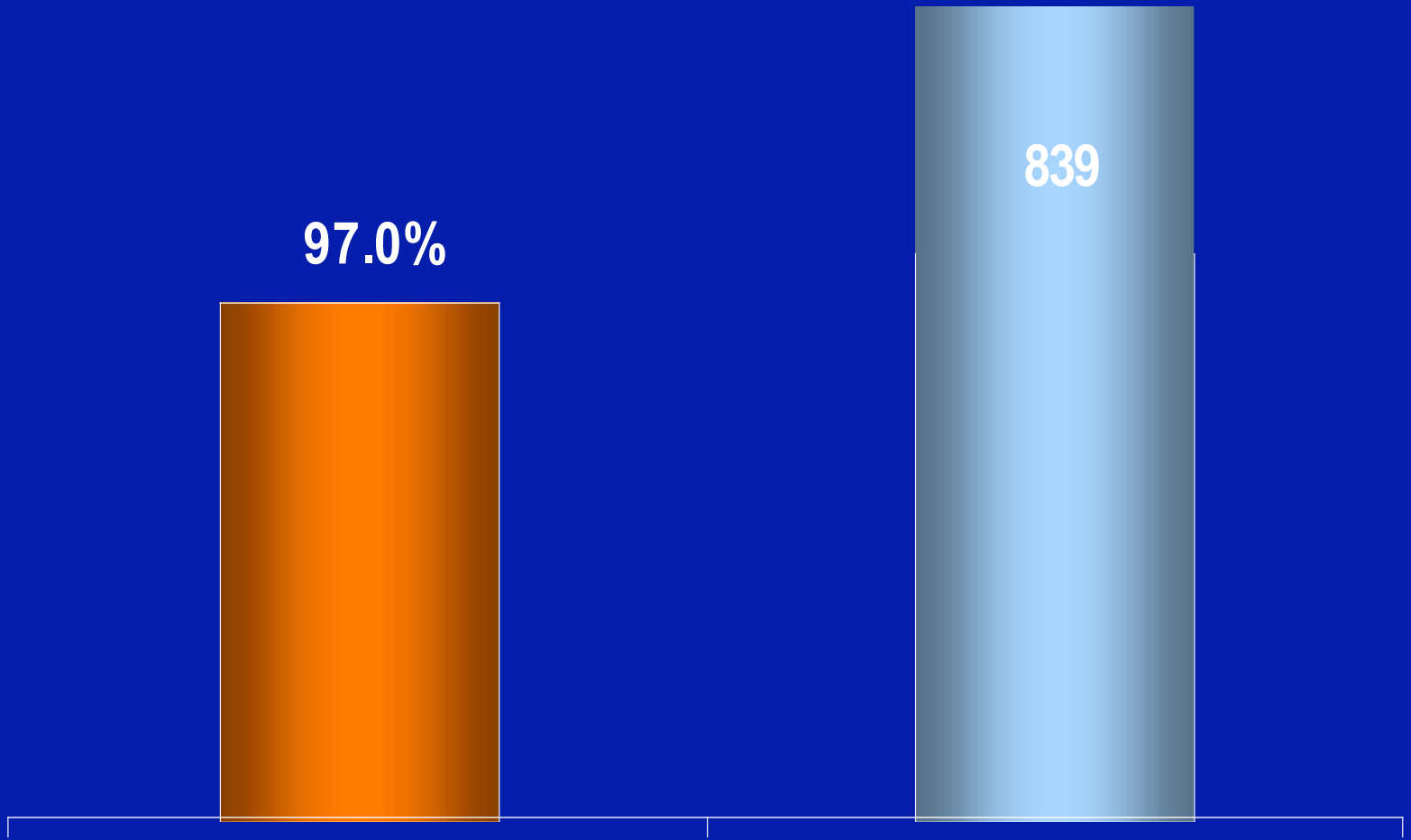
Heart Failure Symptoms

Variable	Standard Care n=155	HFMS n=160	p-value
Mean duration (years) Range	3.4±3.7 (0 - 21)	2.9±3.6 (0 - 21)	0.11
Mean weight (kg)	72.8±17.7	72.5±18.8	0.83
NYHC classification II III	 59.3 40.7	 57.5 42.5	0.74

Disease Characteristics

Variable	Standard Care n=155	HFMS n=160	p-value
Ischemic (%)	53.5	56.9	0.55
Documented MI	74.7	82.4	0.21
Angiographic evidence	75.9	84.6	0.15
Mean % left ventricular EF	23.8±8.7	24.3±8.8	0.54
Heart failure 6 months prior to study entry			0.37
1	61.9	59.4	
2	23.2	29.4	
≥3	14.8	11.2	
Heart failure diagnosis (%)	52.3	61.2	0.11
Primary diagnosis			
Pacemaker rhythm	29.0	26.9	0.67

Compliance with HFMS



N = 160 patients monitored over the course of the study

ADVERSE 6-MONTH OUTCOMES BY TREATMENT ASSIGNMENT

Variable	Standard Care n=155	HFMS n=160	p
CVD mortality or heart failure hospitalization (%)	28.8	21.2	0.15
Mean total length of stay – Heart failure hospitalizations (days)†‡ Median Range	9.3±12.2 5.0 (1 - 67)	10.0±7.3 8.0 (1 – 24)	0.22
Hospital admission reason: Heart failure (%) Other CAD (%) Non-CAD (%)	 23.7 12.7 21.1	 18.8 19.0 22.3	 0.31 0.16 0.81

Comparison of Cost Variables Between Study Arms

Type of Services	Costs to the Medicare Program					
	SC			HFMS		
	Mean	Std	Median	Mean	Std	Median
Outpatient	$865.67	$2,228.89	$341.81	$1,006.66	$2,127.44	$363.26
Home Health	$1,155.93	$2,304.29	$0.00	$1,194.78	$2,448.27	$0.00
Hospice	$135.98	$1,067.83	$0.00	$10.60	$102.18	$0.00
Physician Service	$2,311.81	$2,387.50	$1,757.72	$2,606.81	$2,728.74	$1,620.35
Durable Medical Equipment	$575.00	$923.38	$164.31	$819.81	$1,526.10	$144.40
Inpatient	$8,816.71	$13,999.95	$0.00	$11,395.24	$16,834.06	$3,393.00
Drug	-	-	-	-	-	-
Intervention	$25.00	$0.00	$25.00	$804.00	$0.00	$804.00
Total Cost*	**$13,886.10**	$17,556.34	$8,076.59	**$17,837.90**	$20,559.07	$8,900.90

Comparison of Cost Variables Between Study Arms

Type of Services	Societal Costs					
	SC			HFMS		
	Mean	Std	Median	Mean	Std	Median
Outpatient	$1,139.22	$2,488.29	$477.76	$1,367.60	$2,716.66	$493.09
Home Health	$1,155.93	$2,304.29	$0.00	$1,194.78	$2,448.27	$0.00
Hospice	$135.98	$1,067.83	$0.00	$10.60	$102.18	$0.00
Physician Service	$2,897.59	$2,979.06	$2,166.76	$3,265.31	$3,407.41	$2,116.00
Durable Medical Equipment	$734.05	$1,167.27	$240.83	$1,035.99	$1,913.46	$200.39
Inpatient	$9,366.10	$14,676.98	$0.00	$12,019.64	$17,498.94	$4,233.00
Drug	$512.84	$238.21	$424.38	$492.79	$229.96	$423.50
Intervention	$25.00	$0.00	$25.00	$804.00	$0.00	$804.00
Total Cost*	**$15,966.71**	$18,878.03	$9,771.87	**$20,190.73**	$22,089.45	$11,112.28

Conclusion

Our study results suggest that enhanced patient education and follow up is as successful as a sophisticated home monitoring device with an interactive program and less costly in patients who are elderly and receive the care from a community based primary care practitioner.