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Executive Summary for CAHSAH Members:

An Overview of Home Telehealth

Clinical Outcomes from Telemonitoring Studies

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Why look at home health technologies such as Telehealth?

Chronic disease and cost of readmissions…

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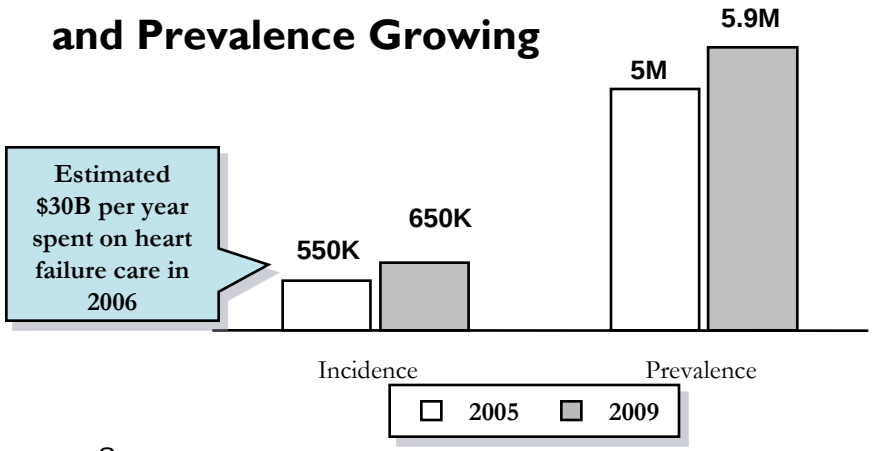
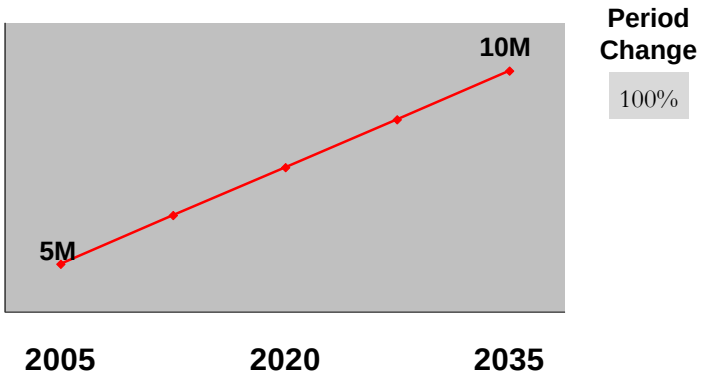
Chronic Disease costs will expand over time and increasingly burden 'home health care'

- Individuals with one or more chronic conditions account for "the overwhelming majority" of medical expenses in the U.S. (e.g. heart failure, COPD, diabetes, hypertension, asthma), e.g. 98.8% of the costs for 65+
- Heart Failure (HF) represents $25-35 billion of healthcare expenditures each year and HF admissions have tripled in the past 26 years
- COPD accounted for $43 billion in U.S. healthcare costs in 2007

Heart Failure Incidence and Prevalence Growing



Heart Failure Prevalence To Double in 30 Years



Sources:
Agency for Healthcare Research and Quality (AHRQ), 2005 report.
Journal of the American College of Cardiology, August 5, 2008 (Data from 1979-2004).
US Dept. of Health & Human Services, National Center for Health Statistics, National Hospital Discharge Survey - 2005

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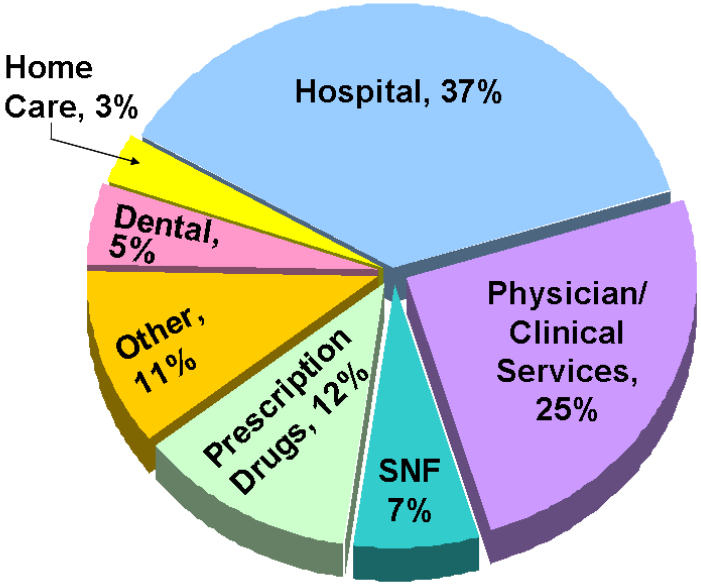
The impact of chronic disease on home care

For Americans over 65:
- 90% have at least one chronic disease
- 70% have two or more

Chronically ill served by home health agencies

Chronic Disease	Persons Served	Number of Visits	Cost
Diabetes	295,000	18,191,000	2,284,877,000
Hypertension	138,000	2,878,000	358,451,000
COPD	71,000	1,534,000	194,496,000
CHF	181,000	4,014,000	515,913,000
Total	**685,000**	**26,617,000**	**$3,353,737,000**

Source: Health Care Financing Review, 2007 Statistical Supplement, Table 7.6, Persons Using Medicare Home Health Agency Services, Visits, Total Charges, Visit Charges, and Program Payments, by Principal Diagnosis Within Major Diagnostic Classifications (MDCs): Calendar Year 2006



Direct Health Care Expenditures by Sector (in 2006)

Hospital (per day)	$5,036
SNF (per day)	$535
Hospice (per day)	$136
Home Health (per visit)	$125

Source: National Association for Home Care & Hospice, Basic Statistics About Home Care, Updated 2007, Table 12: Comparison of Hospital, SNF, and Home Health Medicare Charges, 2004-2006

Data provided by Fazzi Associates, researchers for Philips Chronic Disease / Telehealth Protocols expert design project

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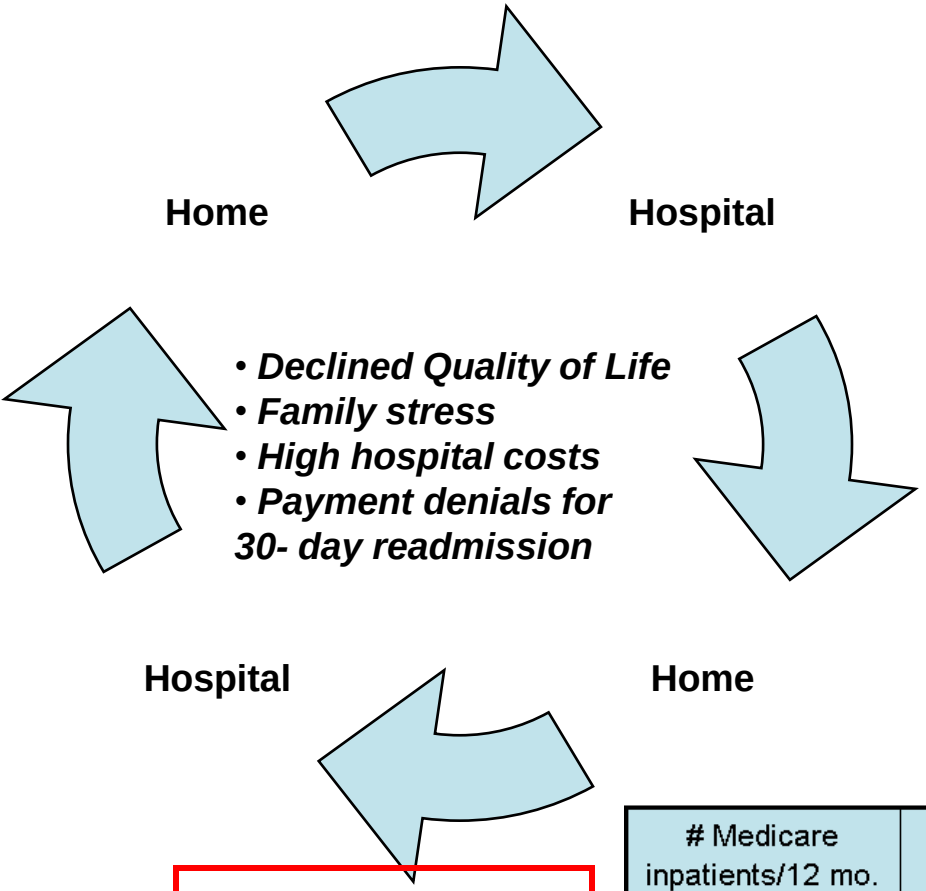
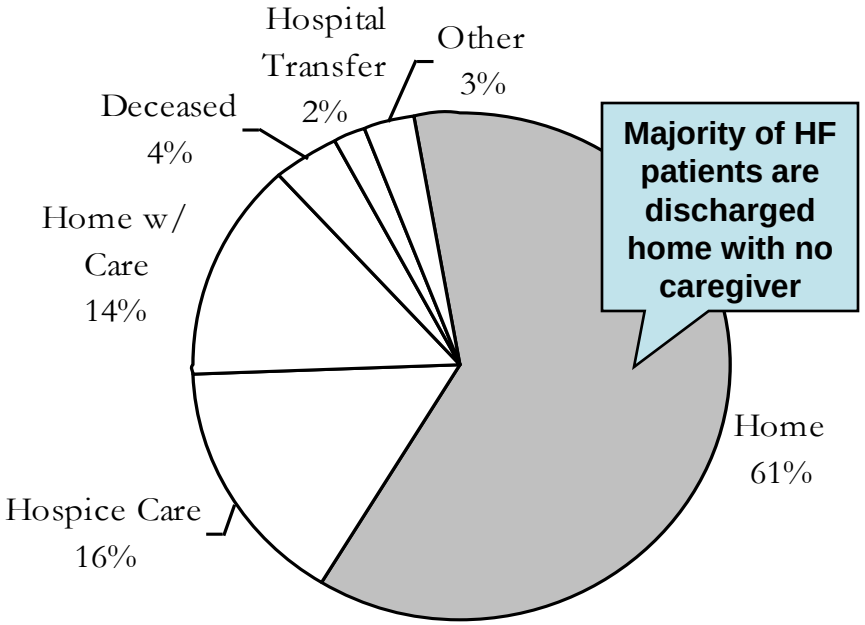
HF Patients Post-Discharge: High risk of readmission due to lack of home care and poor compliance



HF admissions result in a loss for most hospitals



ADHERE Registry. *Final Cumulative National Benchmark Report (2006)*

# Medicare inpatients/12 mo.	Average LOS	Average costs/day	Average costs/stay	Average payment/stay	Average loss per stay
371 w/Heart Failure primary diagnosis	6.7 days	$1,218	$8,160	$6,023	($2,137)

Sample data from Philips customer: hospital in a South East health system.

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The impact of readmissions on healthcare costs is substantial, particularly in the Medicare population

Readmission rates and spending are significant…

- ~18% of Medicare patients are readmitted within 30 days of discharge, resulting in $15B of spending in 2005

Reducing readmission rates is both important and feasible…

- Many readmissions viewed as preventable
  - 75% of all 30-day Medicare readmissions were potential preventable according to Medicare Payment Advisory Commission study (potential savings of $12B to Medicare)
- Wide variation in readmission rates between different cities and hospitals suggests room for improvement
  - Nationwide Medicare readmission rates vary from ~12% to ~22% by city in 2005
- Estimated that Medicare can generate over $100B in savings over next decade by bringing high-cost areas down to national average on 30-day readmissions

Source: Dr. Molly Coye, presentation at Partners Connected Health symposium Oct. 2008

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Early intervention through post-discharge home telemonitoring can break this 'frequent flyer' cycle

- Daily monitoring of patient vital signs (weight, BP, etc.) and health status/ symptoms can identify early signs of deterioration – allowing for clinical intervention before patient is critically decompensated
- Early intervention can prevent unnecessary hospitalization*

  Circulation; October 2, 2007, Issue 1550
- Remote monitoring of CHF patients could save $10.1B / year according to Brookings Institutions report (Robert Litan, Kauffman Foundation economist)
- Home Health Agency outcomes show reduced re-hospitalization rate for telemonitored patients

		Telehealth					Non-Telehealth					
	Date	Number of Events	Total Episodes	Your Rate	CMS Risk Adjusted Ref	SHP Benchmark	Number of Events	Total Episodes	Your Rate	CMS Risk Adjusted Ref	SHP Benchmark	Date
1	May '08	2	8	25.0%	36.0%	25.4%	26	136	19.1%	32.1%	25.5%	May '08
2	Jun '08	3	15	20.0%	36.7%	28.1%	24	116	20.7%	34.1%	26.5%	Jun '08
3	Jul '08	0	9	0.0%	36.6%	25.9%	20	109	18.3%	35.7%	25.9%	Jul '08
4	Aug '08	2	13	15.4%	37.3%	20.1%	23	118	19.5%	34.6%	26.8%	Aug '08
	Totals:	7	45	15.6%	36.7%	25.2%	93	479	19.4%	34.0%	26.1%	

SHP benchmark data for patients on Philips telemonitoring devices, At Home Care (Medicare-certified agency in NY)

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How does it work?

Home Telehealth Enables Post-Discharge Monitoring by Home Health Providers

Intelligent Automated Interactions –
based on patient responses to health status surveys

Exception-based Interventions –
Triggered by flags from out-of-range vital sign data

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Benefits of Home Telehealth

Improved patient outcomes with early intervention

- Proven to reduce cardiac re-hospitalizations for CHF patients[1]
- Leads to better clinical outcomes and financial performance[2]
- Enhances patients' compliance and self-care regimen

1 TEN-HMS Study published in JACC, May 17, 2005; John GF Cleland, MD, Aggie Balk, MD, et al clinical investigators

2 Philips National Study presented at NAHC Oct 8, 2007; Fazzi Associates BestWorks national database

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How Disease Management can be applied in home care

Population Review

Data Analysis

- "Frequent Flyers"
- Hospitalized in past 3 months
- High utilizers of resources
- Non-compliance
- HF Stage 2 & 3
- Co-morbidities
- Hospital medical claims

Risk Stratification

Patient Interventions

Low visit frequency Telephony Shorter LOS	Need physician involvement Standing orders Monitoring/Intervention protocols Address co-morbidities, depression, case mgmt needs Frequent communication with the patient
Set visits as appropriate Telehealth Education	
Telehealth Higher visits Education Longer LOS	

Physician Interventions

Outcomes Tracking & Reporting

ROI Modeling

- LOS
- # of SN Visits
- Hospitalizations
- Re-admits
- ER utilization

Constantly evaluate patient needs

Select the patients that would benefit → Determine who is a risk & determine the right level of intervention → Communicate with patients and care providers to improve outcomes and promote patient self-management → Monitor & track cost/benefit ratio

Adjust program

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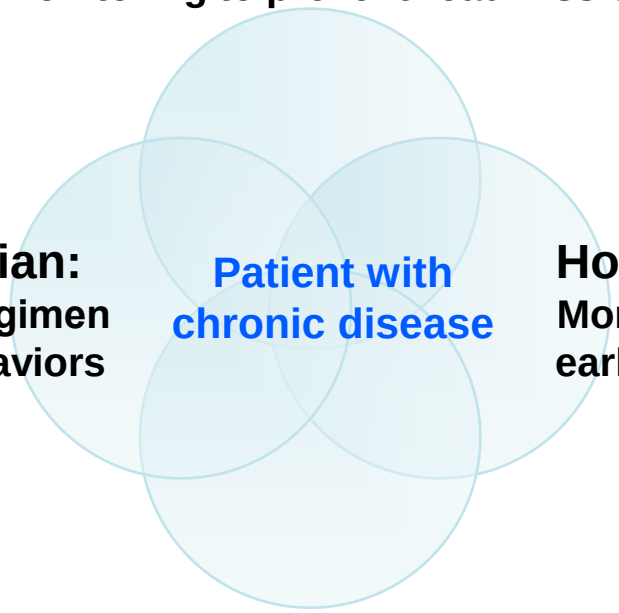
Creating the Home Health infrastructure to deliver quality in-home Disease Management

Hospital:
Refer appropriate patients at discharge for telemonitoring to prevent readmissions

Primary Care Physician:
Reinforce patient's care regimen and self-management behaviors



Home Health Provider:
Monitor patient status for earlier clinical intervention

Home Telemonitoring as Enabling Technology

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Market research findings from the Philips National Study

The Philips National Study on Homecare Technology and Telehealth was the first representative market research survey of the U.S. home health industry, with telephone surveys conducted during Q3 2007 by Fazzi Associates of 976 home health agencies.

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Telehealth Improved Home Health Quality Metrics

- 89% of agencies surveyed report telehealth led to an increase in quality outcomes, often used as part of a disease management program
  - 76.6% cite reduction in unplanned hospitalizations
  - 77.2% cite reduction in ER visits

- 76% of agencies also report improved patient self-care

Impact on Quality Indicators

	Yes	No	Don't Know
Overall Quality	88.6%	3.6%	7.8%
Emergent Care	79.8%	8.9%	11.3%
Unplanned Hospitalizations	75.4%	14.4%	10.2%
Patient Satisfaction	70.8%	15.5%	13.7%

Source: The Philips National Study on Home Care Technology and Telehealth, presented by Dr. Robert Fazzi at the NAHC Annual Meeting, Oct. 2007.

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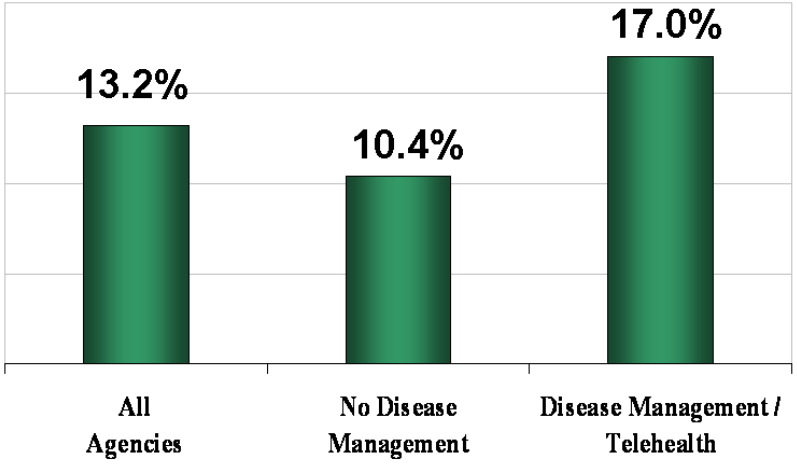
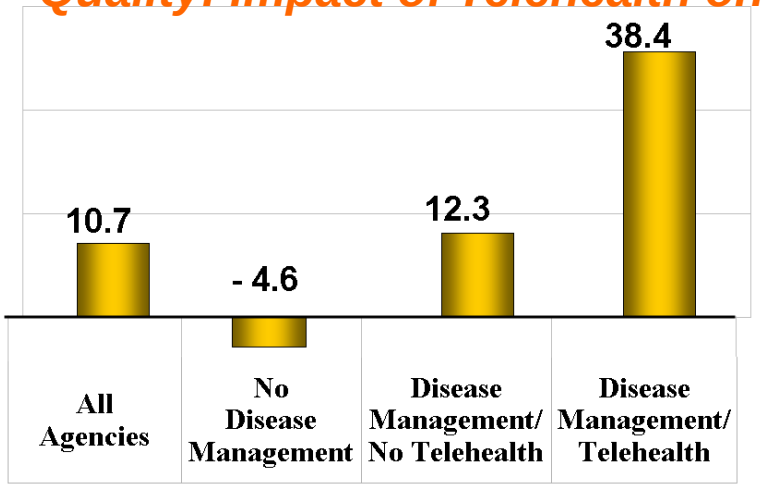
Disease Management and Telehealth Improved Outcomes

- 66.3% of agencies using telehealth do so as part of a disease management program
- Use of both disease management and telehealth leads to better clinical outcomes and financial performance
  - Better margins: 17.0% with vs. 10.4% without*
  - Improved quality: +38.4 with vs. -4.6 without*

Profitability: Impact of Telehealth on DM



Quality: Impact of Telehealth on DM



Source: Fazzi Associates BestWorks National Database of home health agencies, Oct. 2007

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Clinical proof of improved outcomes through Telehealth…

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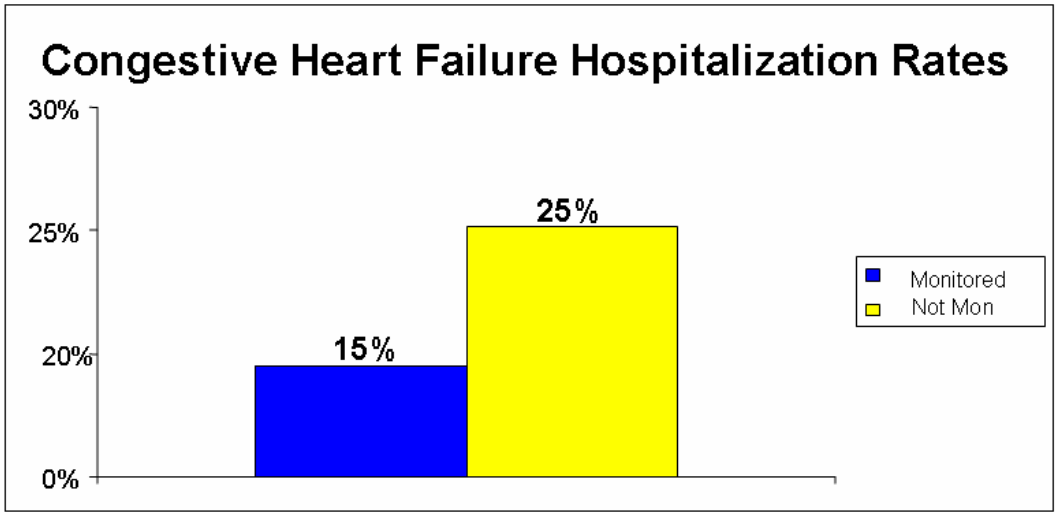
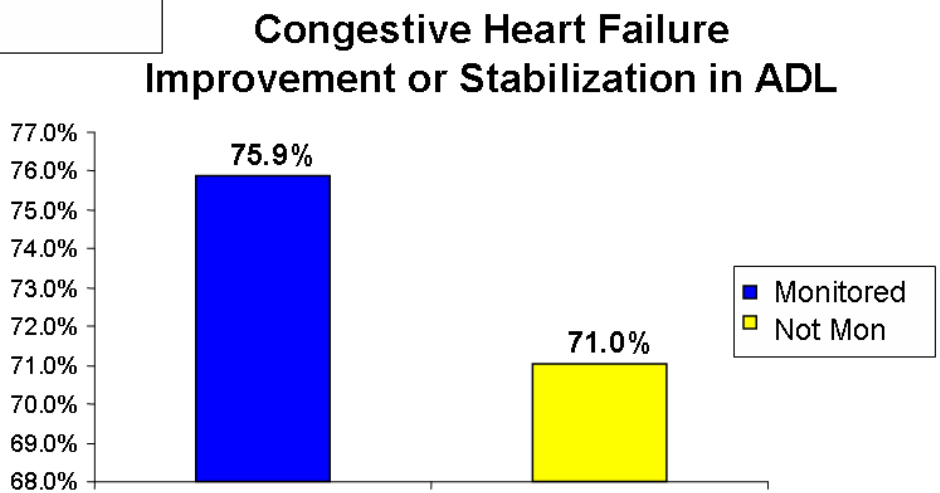
Telemonitoring reduces HF Hospitalization Rates and leads to ADL Improvements according to SHP data

(Strategic Healthcare Programs, a leading home health outcomes and benchmarking firm)



Significant drop in admissions observed by SHP clients using telehealth



"With proper protocols, implementation and accountability, home health agencies can decrease skilled nursing visits by 5-7 per 60-day Medicare episode."

Source: SHP data on U.S. home health

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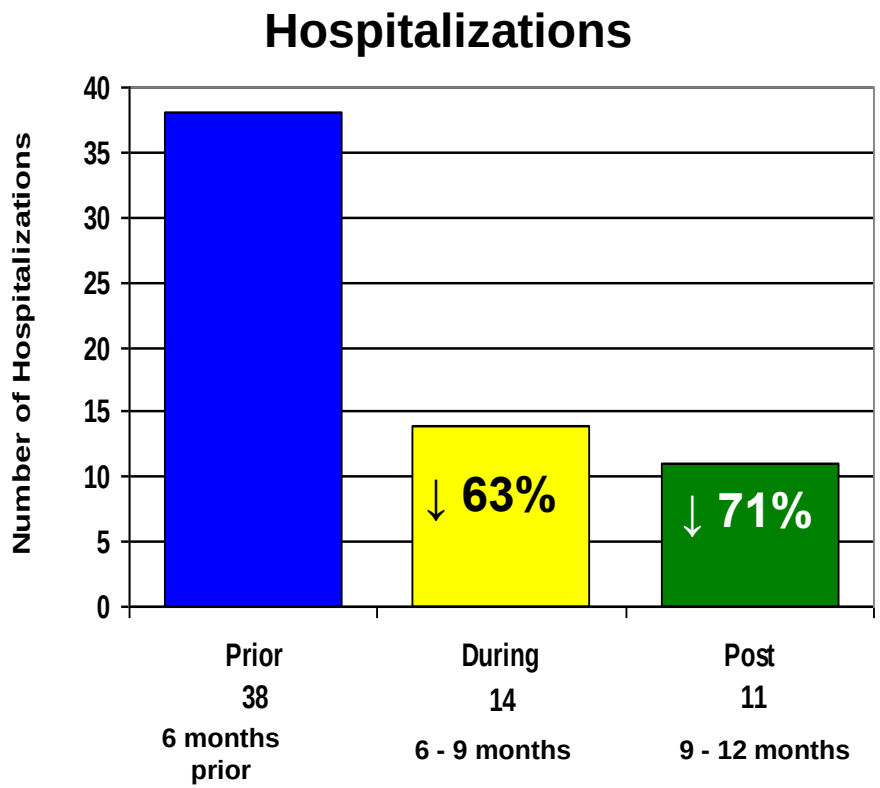
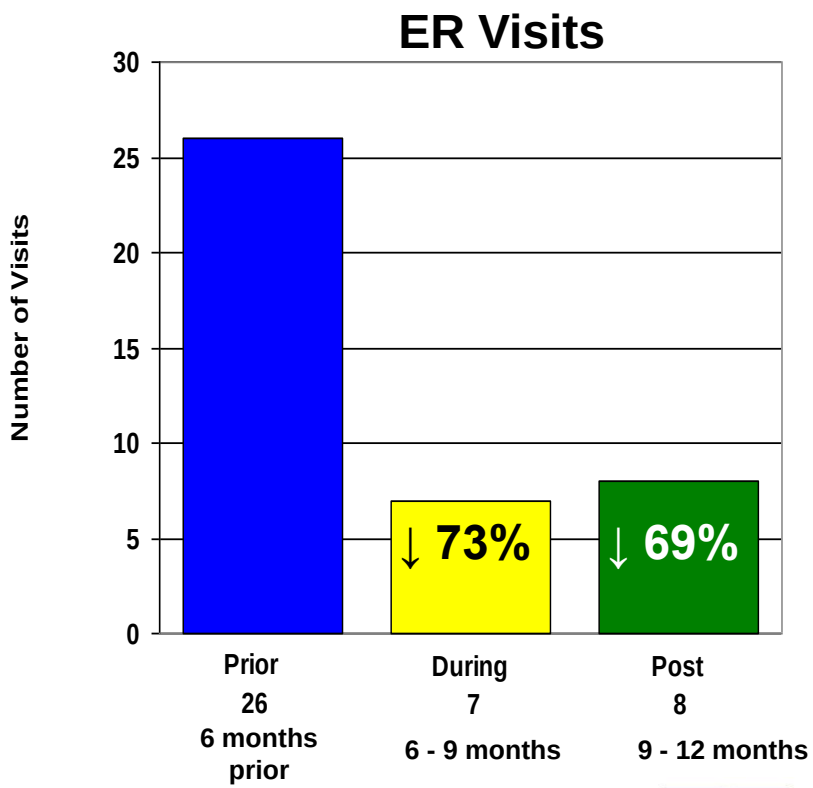
Cost reductions realized by Community Health Center

- Hospitalizations and ER visits decreased during home telehealth program
- Positive results continued after telehealth program ended
- Total hospital charges dropped 81% during telehealth and continued to decrease





n = 40 In-home patients

Analyzed charges are related to diseases being monitored.

Roanoke Chowan Community Health Center / PPCTN Cost Data Ending December 2007

care to act nc best health care for all

Roanoke Chowan Community Health Center You Can Feel The Difference

North Carolina Health & Wellness Trust Fund

Lower rehospitalization rates for telemonitored patients vs. non-monitored patients and much lower than CMS projections

SHP Home | Agencies | Outcomes Search Logout

Outcomes

Outcome: Hospitalization (risk adjusted)
Payment Type: Medicare or Medicaid
Telehealth: Comparison
Date Range: 5/1/2008 – 8/31/2008
Diagnosis: all
Group By: Month
Results To: Screen
SHP ☑
submit

		Telehealth					Non-Telehealth					
	Date	Number of Events	Total Episodes	Your Rate	CMS Risk Adjusted Ref	SHP Benchmark	Number of Events	Total Episodes	Your Rate	CMS Risk Adjusted Ref	SHP Benchmark	Date
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SHP benchmark data for home health agency (At Home Care in NY)

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Tufts-NEMC SPAN-CHF II Telemonitoring Study

Study Design

- 188 patients recently hospitalized for heart failure
- 90-day prospective randomized controlled study
- Compared disease management approaches: telephonic-only vs. weekly telephone call + home telemonitoring
- Reported at AHA scientific sessions Nov. 2005

Results:

	% reduction for intervention group
HF hospitalizations (p=0.030)	72%
Cardiac hospitalizations (p=0.029)	63%
All Cause hospitalizations (trend)	20%

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Home Health Cardio-Pulmonary Telemonitoring Study

Study Design

- 733 patients in cardio-pulmonary program
- Average of 230 patients in telemonitored group
- 87% over age 65, 51% female
- Two-year timetable ending April 2006
- Study performed by Philips customer, a large home health organization
- Shows impact of post-discharge monitoring continues after episode of care ends

Results

		At time of admission	At time of discharge	16 weeks post discharge
Use of Emergency Room	⇩	71%	10%	6%
Medication Compliance (understand their meds)	⇧	51%	96%	99%
Functional Improvement in Activities of Daily Living (ADL)	⇧	38%	92%	92%

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Trans-European Network Home-care Management Systems (TEN-HMS) Study

Study Design

- 426 heart failure patients recently hospitalized, with LVEF < 40%
- 168 patients in telemonitored group
- 240-day prospective randomized trial
- Two-year timetable ending July 2002
- Clinical investigators were leading cardiologists in 3 European countries
- Presented by Dr. John GF Cleland at the 24th Congress of the ESC in 2002
- Published in the May 17, 2005 issue of the *Journal of the American College of Cardiology*

Noninvasive Home Telemonitoring for Patients With Heart Failure at High Risk of Recurrent Admission and Death

The Trans-European Network–Home-Care Management System (TEN-HMS) Study

John G. F. Cleland, MD,* Amala A. Louis, MD,* Alan S. Rigby, PhD,* Uwe Janssens, MD,† Aggie H. M. M. Balk, MD,‡ on behalf of the TEN-HMS Investigators

Kingston Upon Hull, United Kingdom; Aachen, Germany; and Rotterdam, the Netherlands

OBJECTIVES We sought to identify whether home telemonitoring (HTM) improves outcomes compared with nurse telephone support (NTS) and usual care (UC) for patients with heart failure who are at high risk of hospitalization or death.

BACKGROUND Heart failure is associated with a high rate of hospitalization and poor prognosis. Telemonitoring could help implement and maintain effective therapy and detect worsening heart failure and its cause promptly to prevent medical crises.

METHODS Patients with a recent admission for heart failure and left ventricular ejection fraction (LVEF) <40% were assigned randomly to HTM, NTS, or UC in a 2:2:1 ratio. HTM consisted of twice-daily patient self-measurement of weight, blood pressure, heart rate, and rhythm with automated devices linked to a cardiology center. The NTS consisted of specialist nurses who were available to patients by telephone. Primary care physicians delivered UC. The primary end point was days dead or hospitalized with NTS versus HTM at 240 days.

RESULTS Of 426 patients randomly assigned, 48% were aged >70 years, mean LVEF was 25% (SD, 8) and median plasma N-terminal pro-brain natriuretic peptide was 3,070 pg/ml (interquartile range 1,285 to 6,749 pg/ml). During 240 days of follow-up, 19.5%, 15.9%, and 12.7% of days were lost as the result of death or hospitalization for UC, NTS, and HTM, respectively (no significant difference). The number of admissions and mortality were similar among patients randomly assigned to NTS or HTM, but the mean duration of admissions was reduced by 6 days (95% confidence interval 1 to 11) with HTM. Patients randomly assigned to receive UC had higher one-year mortality (45%) than patients assigned to receive NTS (27%) or HTM (29%) ($p = 0.032$).

CONCLUSIONS Further investigation and refinement of the application of HTM are warranted because it may be a valuable role for the management of selected patients with heart failure. (J Am Coll Cardiol 2005;45:1654–64) © 2005 by the American College of Cardiology Foundation

Journal of the American College of Cardiology
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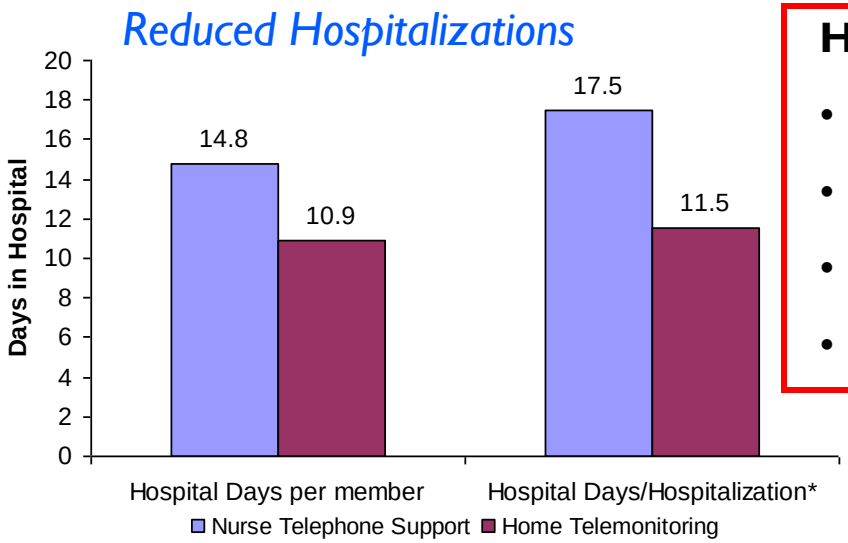
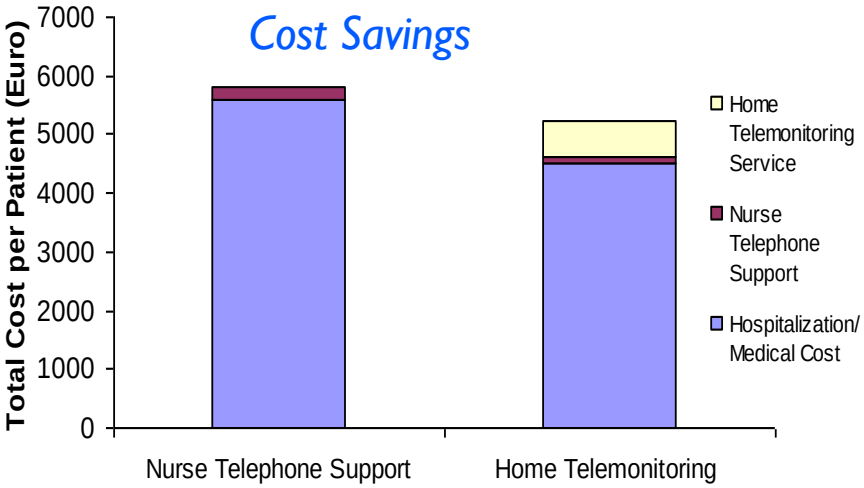
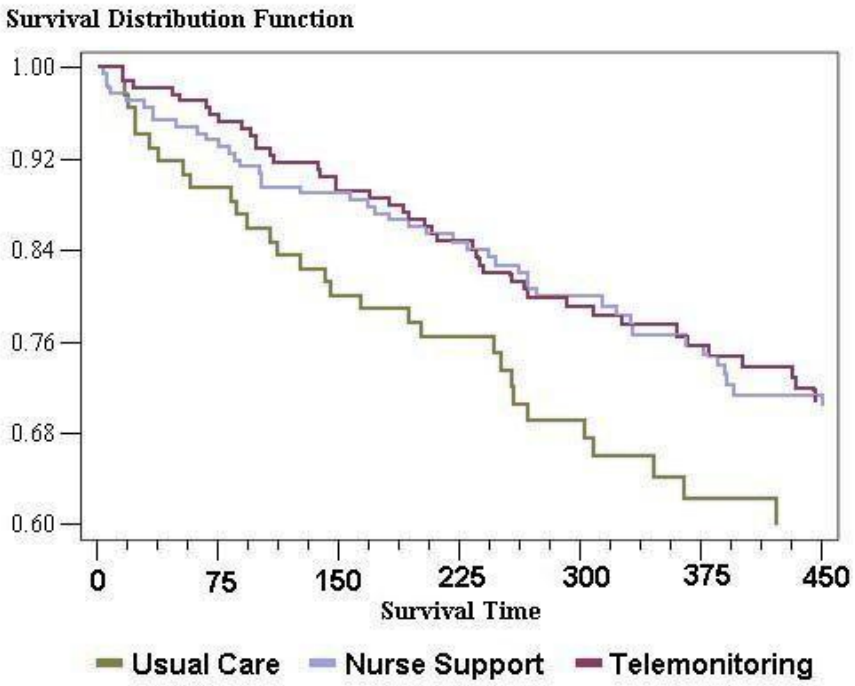
European Telemonitoring TEN-HMS Study findings



Home Telemonitoring led to:

- ***26% fewer days in hospital than Nurse Support***
- ***10% cost savings over Nurse Support program***
- ***ROI of 2.1 vs. Nurse Support***
- ***29% higher survival rate than Usual Care***





Source:TEN-HMS Study, JACC May 17, 2005

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Philips Home Healthcare Solutions

Extending the delivery of care from hospital to home

Supporting independent living

Supporting remote monitoring

Lifeline

Medical alert services (PERS)

Home Telehealth Solutions

Post-discharge telemonitoring

Cardiac Monitoring Services

Arrhythmia, ICD, INR monitoring

RESPIRONICS

Sleep Apnea and Respiratory Products

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