Remote Patient Monitoring

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The Third National Medicare Readmissions Summit

Washington, D.C., June 14

"We're changing the way people think about health..."

Public Health Institute

Center for Innovation and Technology in Public Health

Center for Technology and Aging

- Established in 2009 when PHI acquired the Health Technology Center's intellectual property and human resources

- Mission: Accelerate the adoption and appropriate use of technology-enabled innovations in improving the public's health

- Independent research and evaluation group focusing on technology-enabled innovations to improve population health

- Established in 2009 with funding from The SCAN Foundation, located at the Public Health Institute

- Mission: Expand the use of technologies that help older adults lead healthier lives and maintain independence

- Independent, non-profit resource center on issues related to diffusion of technology for older adults

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Reducing Rehospitalizations Through Innovative Technologies That Improve Care Coordination

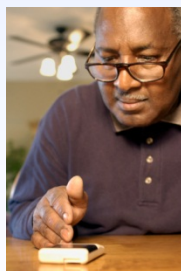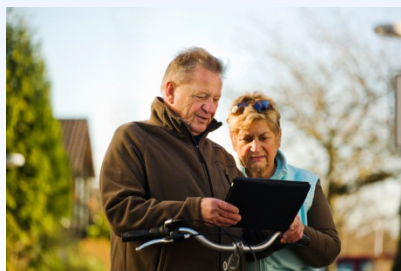This Commonwealth Fund-supported project involves a **two-year** effort:

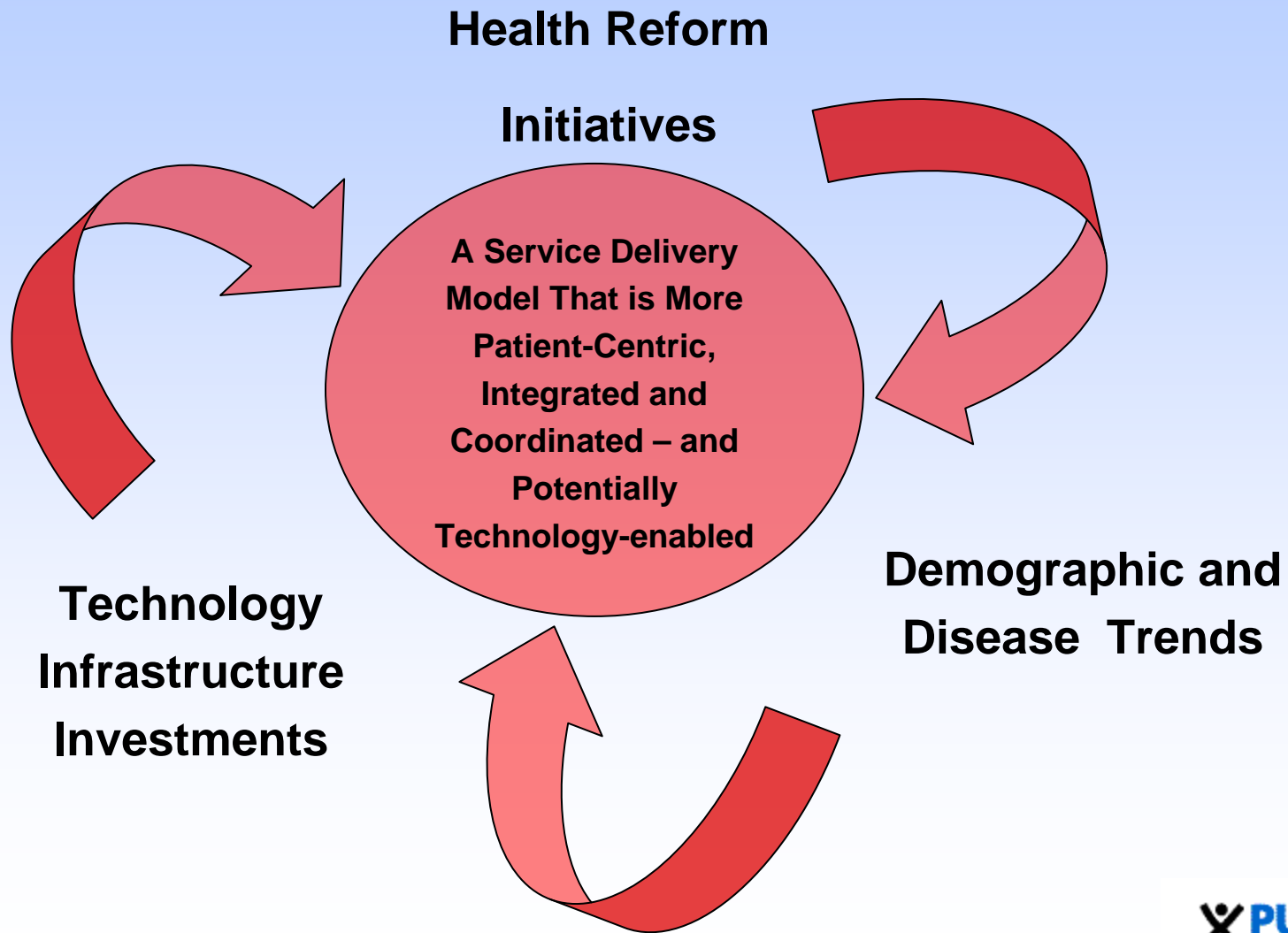| Process	Deliverables
Evaluation	• Working Paper
Business Planning	• Case Study • Tools
Operations	• Case Study

Center for Technology and Aging:
Diffusion Grant Program Areas

- Medication Optimization
- Remote Patient Monitoring
- Post Acute Care Transitions (Tech4Impact)
- mHealth

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New Opportunities for Redesigning Care Delivery

Health Reform

Initiatives

A Service Delivery Model That is More Patient-Centric, Integrated and Coordinated – and Potentially Technology-enabled

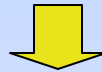**Technology Infrastructure Investments**

Demographic and Disease Trends

5

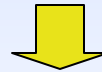# Preventable Readmissions: Current State and Future Implications

Challenges in care transitions

- Communication and care coordination
- Patient compliance with care plan

Improve care coordination, outreach and patient engagement

- Multidisciplinary team management
- Patient centered information
- Patient education and support

Technology-enabled processes that lend themselves to supporting

- Evidence-based care
- Care coordination
- Patient-provider communications
- Self-management

Effective Interventions in Care Coordination

Three types of interventions have been demonstrated to be **effective in reducing hospitalizations for Medicare beneficiaries** with multiple chronic conditions who in general are not cognitively impaired*

1. **Transitional care interventions**
    - Engage patients while in hospital to prepare for the hospital-home transition
    - Follow intensively over the 4 - 6 weeks after discharge

2. **Self-management education interventions**
    - Activate patients in the management of their condition
    - Engage patients in community-based programs over 4 -7 weeks
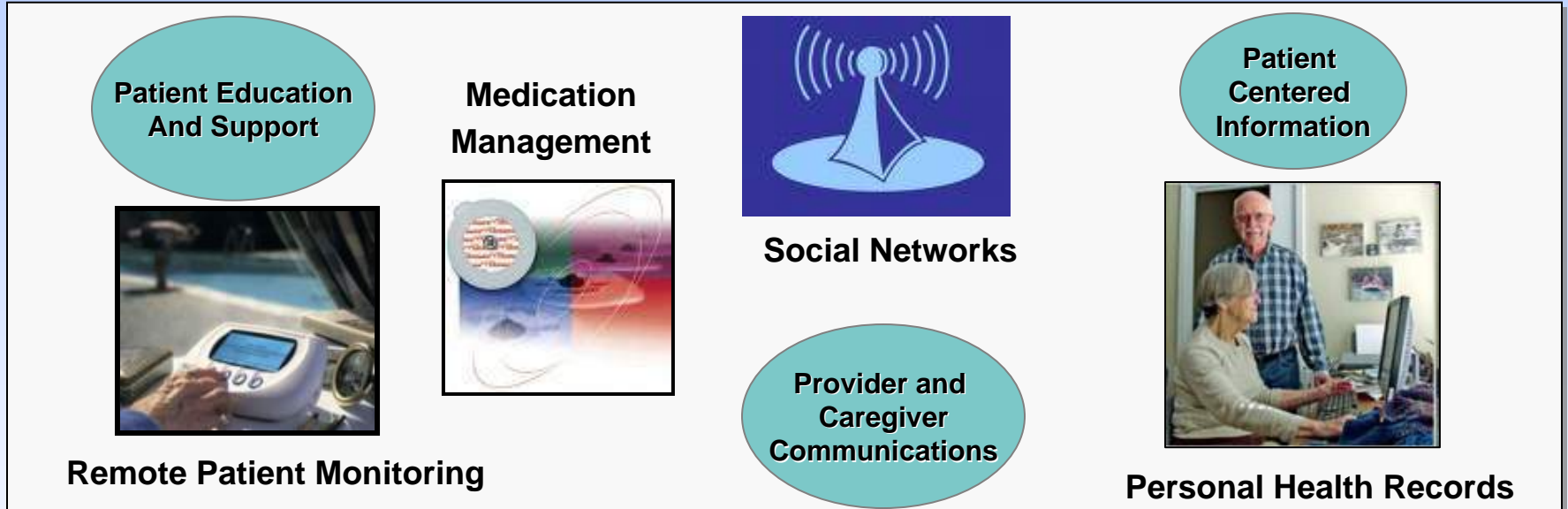
3. **Coordinated care interventions**
    - ID patients at high risk of hospitalization, and conduct assessment and care planning
    - Provide ongoing monitoring of patient care and care team communications

Programs that combine all three types of interventions have the potential to reduce hospitalizations and costs more than any one

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The Potential Contribution of Multiple Technologies

Patient Education And Support

Medication Management

Social Networks

Patient Centered Information

Remote Patient Monitoring

Provider and Caregiver Communications

Personal Health Records

Technology options should be considered if appropriate and they lead to care coordination that is efficient, effective and satisfying for patients and providers

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Interactive Consumer Health IT: Barriers and Drivers to Use

The greatest positive effect on patient care processes and outcomes is found when a complete feedback loop is provided between physician recommendations and patient actions through the following functions:

– Monitoring current health status

– Interpretation of data in light of established, individualized treatment goals

– Adjustment of the care management plan as needed

– Communication back to the patient with tailored recommendations or advice

– Repetition of this cycle at appropriate intervals

Evidence Report/Technology Assessment

AHRQ Evidence Reports

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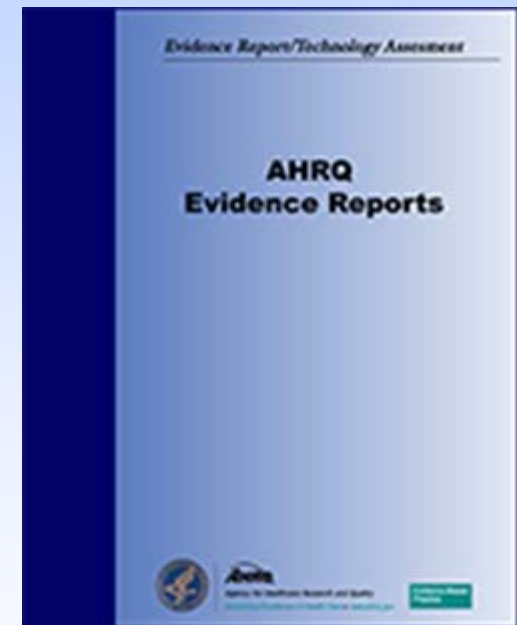
Remote Health Services and Health IT

Interactions where patient and provider are physically separate but virtually connected to facilitate patient data collection and transmission to improve care coordination and communications and to actively support remote patient care.

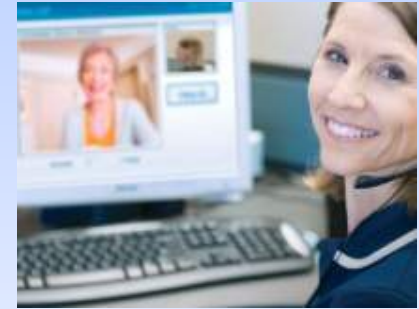| **Person interacts with telehealth device** | → | **Personal information is collected & transmitted** | → | **Care team reviews data & follows up as appropriate** |

Data collected includes:

- Vital signs monitoring (blood pressure, blood glucose levels, pulse, weight; etc)

- Physical, behavioral, and cognitive well-being assessments

Data transmitted over:

- Video over low-bandwidth POTS

- Video over IP

- LAN/WAN

- Broadband

Results include:

- Improvement in care coordination and caregiver support

- Reduction in unnecessary visits and hospitalizations

- Improvement in medication compliance and treatment outcomes

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Remote Patient Monitoring:
Monitoring, Evaluation, and Management

RPM performs a range of capabilities, including:

- Monitoring of therapeutic processes
- Tracking of health and preventive behavior
- Managing chronic disease and post acute care
- Improving self-management role
- Supporting patient needs with daily life and personal safety

Remote Patient Monitoring:
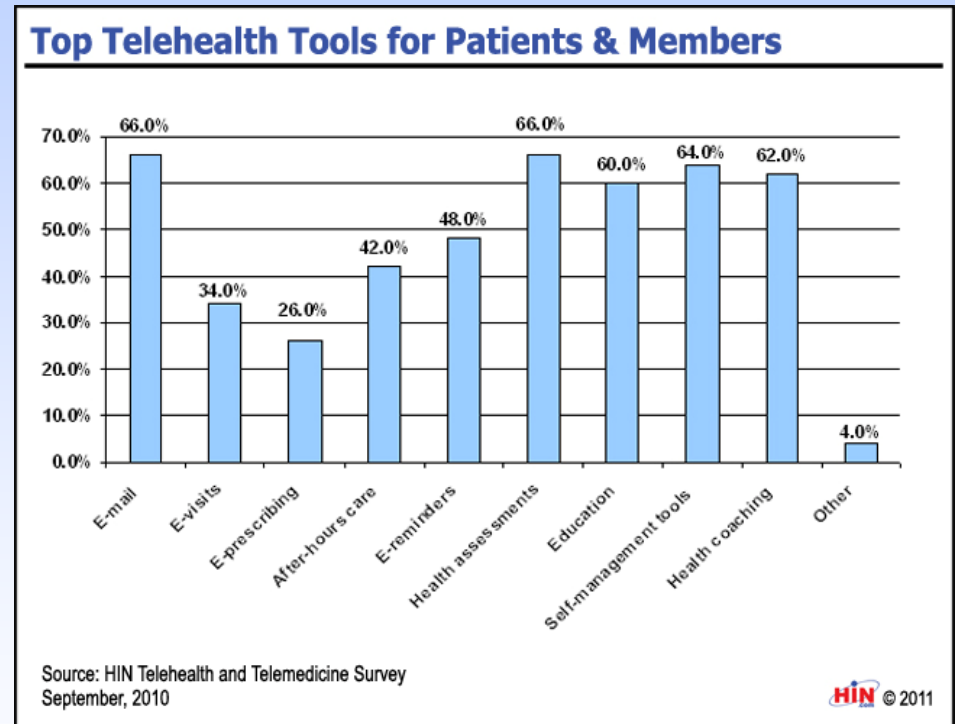# Patient Self-Management Tools and Skills

The ability to engage and activate patients and augment their self-management skills is critical to the value of integrated RPM devices:

RPM capabilities	Resultant Support via Technology
Managing therapeutic processes	- Disease knowledge - Vital signs and self-reporting - Take medication - Rules of conduct - Physiotherapy
Managing health and preventive behavior	- Nutrition - Physical exercise - Cognitive exercise - Social interaction - Stress reduction
Managing the role of the chronically ill patient	- Dynamics of health status and disease progress - Navigating the health care system - Relationship to health care professionals - "Action plans"
Managing daily life	- Maintain autonomy in daily life - Deal with disease related implications - Support in daily life by friends, family members and informal helpers
Managing crises	- Be prepared for crises - Recognize crises - Call for help

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Remote Patient Monitoring:
Targeted Applications

Targeted Health Conditions
Monitored Remotely*

- Heart failure 77.1 percent

- Diabetes 74.3 percent

- COPD 54.3 percent

- Med adherence 54.3 percent

- Asthma 42.9 percent

Top Telehealth Tools for Patients & Members

Tool	Percent
E-mail	66.0%
E-visits	34.0%
E-prescribing	26.0%
After-hours care	42.0%
E-reminders	48.0%
Health assessments	66.0%
Education	60.0%
Self-management tools	64.0%
Health coaching	62.0%
Other	4.0%

Source: HIN Telehealth and Telemedicine Survey
September, 2010

HIN © 2011

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Remote Patient Monitoring Support for Chronic Care Management

In the drive to reduce costs, improve quality and satisfaction, and increase the productivity of primary care health workers, early adopters identify six components of chronic care management facilitated by remote patient monitoring*

- **Early intervention:** to detect deterioration and intervene before unscheduled and preventable services are needed

- **Integration of care:** exchange of data and communication across multiple co-morbidities, multiple providers, and complex disease states

- **Coaching:** motivational interviewing and other techniques to encourage patient behavioral change and self-care

- **Increased trust:** patients' satisfaction and feelings of "connectedness" with providers

- **Workforce changes:** shifts to lower-cost and more plentiful health care workers, including medical assistants, community health workers, and social workers

- **Increased productivity:** decreased home visit travel time and automated documentation

Coye, M.J., Haselkorn, A., & DeMello, S. (2009). Remote Patient Management: Technology-Enabled Innovation and Evolving Business Models for Chronic Disease Care. Health Affairs, 28(1), 126-135

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Remote Patient Monitoring: Evidence of Reducing Rehospitalizations

Interventions incorporating elements of monitoring and evaluation and patient management promoting compliance over short periods, primarily in CHF patients, demonstrate value in a number of outcome measures and process improvements.

- Discharge program at Saddleback Memorial Medical Center incorporating wireless remote health monitoring systems **reduced readmissions by 50%.**[1]
- CMS's Care Management of High Cost Beneficiaries Demonstration at Wenatchee Valley Medical Center reported a **17.7% decrease in ER Visits.**[2]
- Allegan Homecare **reduced nurse home visits** from an average of 22 to 12 per episode, leading to an **increase in average patient case load from 15 to 25.**[3]
- Banner Home Care reported a **readmission rate of 3.8%** for patients with heart failure **compared with a national readmission rate of 29%** for Medicare-certified home health agencies.[4]

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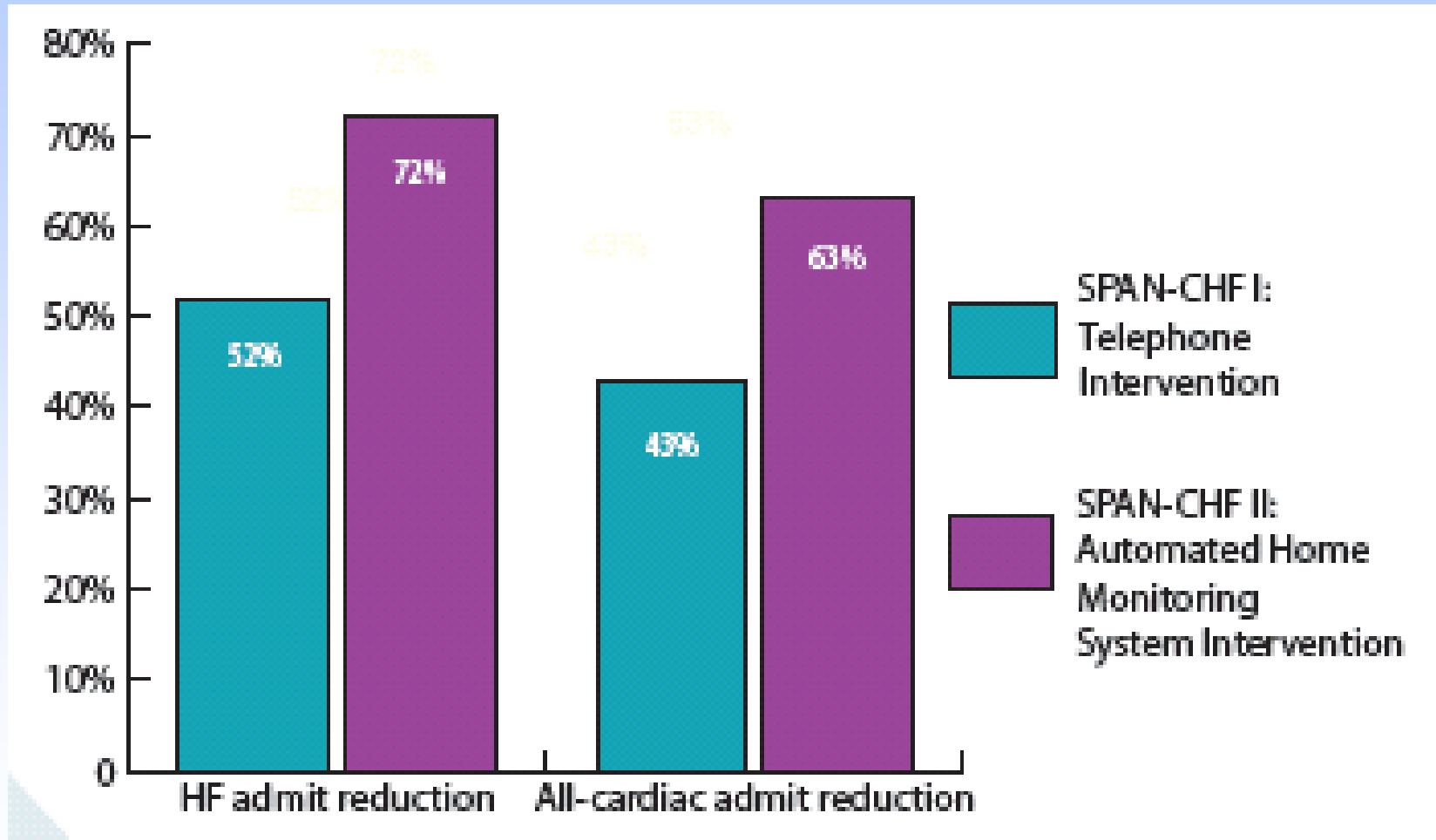
Remote Patient Monitoring: TEN-HMS Study

The world's first large-scale, randomized prospective trial to determine if home telemonitoring services for HF could reduce hospitalizations and improve well-being while reducing overall costs of care compared to nurse telephone support and standard care:

- **26% fewer days in hospital relative to nurse telephone support**
- **Overall 10% cost savings relative to nurse telephone support**
- **ROI of 2.1 relative to nurse telephone support**
- **Improved survival (15%) relative to usual care**
- **Higher levels of patient satisfaction**

Home Telemonitoring Led to Cost Savings. Total cost per patient. Legend: Nurse Telephone Support; Hospitalization/medical cost; Home Telemonitoring Service. Data at 240-day follow-up. Conversion rate was approximately $1.10/Euro during the study.

Home Telemonitoring Reduced Hospitalization. Hospital days per patient: 14.8 (Nurse Telephone Support), 10.9 (Home Telemonitoring). Hospital days/hospitalization*: 17.5 (Nurse Telephone Support), 11.5 (Home Telemonitoring). Data at 240-day follow-up. *p < 0.05

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Remote Patient Monitoring:
Specialized Primary and Networked Care in HF

Remote Patient Monitoring:
Conditions for Success

Key conditions for successful RPM deployment and statistically significant clinical results reflect a mix of technology, human, and organizational management factors

Category	Condition
Patient	• No moderate or severe cognitive, visual, or physical impairment • Life expectancy is not measured in months rather than years • At-risk for deterioration and hospitalization but motivated patients
Device	• User-friendly and non-intrusive nature • Effective matching with individual patient's needs and capabilities • Automation simplifies data capture and offers greater reliability • Promote patient access to information to actively engage
Organization	• Adapt the means and frequency of monitoring to each patient's needs • Design and implementation that supplements primary care practices • Close collaboration between staff and other clinical professionals

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The Early Adopter Experience: Veterans Health Administration (1 of 2)

- VHA has evaluated, piloted, reevaluated, and deployed RPM technologies in a continuing process of learning and improvement far beyond adoption in the private sector

- Currently, there is no program elsewhere in the U.S. of the size and complexity of VHA's national program to enable detailed comparison

- Home telehealth programs drive substantial benefits as alternatives to traditional care models:
  - Findings from comparative studies conducted on patients enrolled in the VA's Care Coordination/Home Telehealth program in 2006 and 2007 show:
    - 25% reduction in bed days of care
    - 20% reduction in numbers of admissions
    - 86% mean satisfaction score rating

Care Coordination/Home Telehealth: The Systematic Implementation of Health Informatics, Home Telehealth, and Disease Management to Support the Care of Veteran Patients with Chronic Conditions

Adam Darkins, M.D., Patricia Ryan, R.N., M.S., Rita Kobb, M.N., A.P.R.N., Linda Foster, M.S.N., R.N., Ellen Edmonson, R.N., M.P.H., Bonnie Wakefield, Ph.D., R.N., and Anne E. Lancaster, B.Sc.

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Abstract

Between July 2003 and December 2007, the Veterans Health Administration (VHA) introduced a national home telehealth program, Care Coordination/Home Telehealth (CCHT). Its purpose was to coordinate the care of veteran patients with chronic conditions and avoid their unnecessary admission to long-term institutional care. Demographic changes in the veteran population necessitate VHA increase its noninstitutional care (NIC) services 100% above its 2007 level to provide care for 110,000 NIC patients by 2011. By 2011, CCHT will meet 50% of VHA's anticipated NIC provision. CCHT involves the systematic implementation of health informatics, home telehealth, and disease management technologies. It helps patients live independently at home. Between 2003 and 2007, the census figure (point prevalence) for VHA CCHT patients increased from 2,000 to 31,570 (1,500% growth). CCHT is now a routine NIC service provided by VHA to support veteran patients with chronic conditions as they age. CCHT patients are predominantly male (95%) and aged 65 years or older. Strict criteria determine patient eligibility for enrollment into the program and VHA internally assesses how well its CCHT programs

meet standardized clinical, technology, and managerial requirements. VHA has trained 5,000 staff to provide CCHT. Routine analysis of data obtained for quality and performance purposes from a cohort of 17,025 CCHT patients shows the benefits of a 25% reduction in numbers of bed days of care, 19% reduction in numbers of hospital admissions, and mean satisfaction score rating of 86% after enrollment into the program. The cost of CCHT is $1,600 per patient per annum, substantially less than other NIC programs and nursing home care. VHA's experience is that an enterprise-wide home telehealth implementation is an appropriate and cost-effective way of managing chronic care patients in both urban and rural settings.

Key words: home telehealth, chronic care, outcomes, patient satisfaction, veterans

Introduction

The Veterans Health Administration (VHA) within the U.S. Department of Veterans Affairs is a large integrated healthcare system. VHA currently delivers healthcare services[1] that serve 5.6 million unique veteran patients annually. A total of 7.6 million veterans are enrolled to receive VHA care.[1] The number of veteran patients aged 85 years or more that VHA treats is set to triple by 2011 compared to 2000 (Fig. 1).

As the U.S. population ages, people are living longer,[3] staying healthier,[3-5] and choosing to live independently at home.[6,7] Responding to these same societal changes has heightened the emphasis Congress[8] and VHA place upon developing noninstitutional

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The Early Adopter Experience: Veterans Health Administration (2 of 2)

Net cost = $1,600 / patient / year vs.
- VHA's home-based primary care services = $13,121 / patient / year
- Market nursing home care rates average = $77,745 / patient / year

VHA attributes the rapidity and robustness of its CCHT implementation to the "**systems approach**" taken to standardizing and integrating the core program elements:
- Product selection
- Training and development
- Protocols - patient selection and management
- Data analytics

VHA Outcomes 2004-2007

Condition	Patients	Decrease Utilization
Diabetes	8,954	20.4
Hypertension	7,447	30.3
CHF	4,089	25.9
COPD	1,963	20.7
PTSD	129	45.1
Depression	337	56.4
Other Mental Health	653	40.9
Single Condition	10,885	24.8
Multiple Conditions	6,140	26.0

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Remote Patient Monitoring:
CTA Diffusion Grants Program

- AltaMed Health Services and Stamford Hospital
- Catholic Healthcare West
- California Association for Health Services at Home
- Centura Health at Home
- HealthCare Partners Institute for Applied Research and Education
- New England Healthcare Institute
- Sharp HealthCare Foundation

Centura Health at Home

Expanding Telehealth Success By Merging with Call Center Activities

Goals	1. Decrease the rate of recidivism for 30-day readmissions by 2% after year one at two hospitals within Centura Health 2. Increase quality of life for project patients as measured through the Quality of Life Survey SF-36. 3. Increase the number of telehealth patients by a minimum of 200 per year after year one.
Population	All Medicare patients readying for hospital discharge regardless of eligibility for home care services
Technology	24/7/365 clinical call center linked with telehealth monitors (inLife by American Telecare) and video conferencing system (American Telecare Lifeview)
Expected Benefits	Reduce hospital/ED visits; improve patient activation, QOL & satisfaction
Workforce Issues	LVN Scope of practice issues, patient recruitment, call center transition delay, ReConnect Program changes (referring program)
Organizational Readiness	CHAH telehealth program in place for 7 years CHAH remains the largest Homecare agency in Colorado as well as part of Centura Health which is the largest Healthcare system in Colorado.

Sharp HealthCare Foundation

Expanding Telehealth to Underserved Seniors in San Diego

SHARP.

Goals	• Reduce 30 day unplanned readmit rates by 30% during the grant term among senior patients. • Reduce direct costs associated with readmissions by 30% among senior patients, clinically related acute care readmits. • Improve coordination of care between hospital and physician office (the primary opportunity for preventing unnecessary hospital admissions). • Improve the quality of life for patients managing multiple comorbidities by keeping them well managed in the home setting. • Increase hospital and emergency room capacity for the community by providing effective care for chronic care patients in the community care model.
Population	CHF, 65+ recently hospitalized, underserved (e.g., Medicare FFS, Medi-Cal, and self-pay) populations
Technology	Cardiocom's Telescale
Expected Benefits	Reduce hospital/ED visits; improve patient activation, QOL & satisfaction
Workforce Issues	Hiring RN Program Coordinator, targeted patient selection, lack of PCP
Organizational Readiness	Sharp has demonstrated reductions in costs, admissions, and overall bed days utilizing RPM for CHF patients.

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Remote Patient Monitoring:
Potential Levers to Realize Greater Value

- Incentive-based Coverage and Payment Policies
- ROI Frameworks
- Implementation Toolkits and Best Practices
- Business Models
- Open Innovation
- Professional Licensure and Scope of Practice
- Consumer Acceptance and Preparedness