Case Study

The Return on Investment (ROI)

From Connect America's Personal Emergency Response Systems (PERS)

ConnectAmerica®
HOW HEALTH AND HOME CONNECT.

OUR VISION

A world where everyone is empowered to age gracefully and well at home.

North America's Largest Provider of Digital Health and Safety

~10M
LIVES PROTECTED

~900K
Active Subscribers Monitored

~1,500
Employees across North America

850K+
Signals, calls or incidents handled monthly

35K+
Patients Monitored with RPM Solutions

3,000+
Provider Partners

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Introducing Connect America Home™:

Your digital health and safety platform

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Case Study Methodology

Objectives*

To evaluate:

- PERS subscriber reported conditions from emergency response calls
- The impact of PERS, predictive analytics and tailored interventions on healthcare utilization and costs
  - Emergency Department Visits
  - Readmission Rates

Population

- 370 adults seniors over age 65
  - Intervention group received tailored intervention
  - Control group received care as usual
- Study timeline
  - 3-month observation period
  - Followed by 6-month active intervention and engagement period

* IRB approved study

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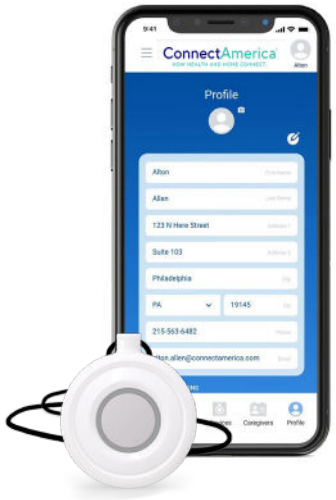
Interventions

Personal Emergency Response Systems

Continuous monitoring and access to help 24/7/365 at home or on the go



Predictive Algorithm

Identifies and predicts individuals who are at risk for hospital transport and admission

- Demographics
- Geography
- Medical conditions
- Caregiver network
- Monitoring incidents
- Behavior

Triage & Intervention

Needs assessment completed along with personalized plan

Personalized plan could include member education over a four-week period, home visits, or tele-monitoring

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Results

A Significant Impact on Utilization and Costs

68% ↓

decrease in 90-day readmissions with corresponding triple decrease of proportion patients with any 90-day readmission**

53% ↓

decrease in 180-day readmissions

49% ↓

decrease of 180-day EMS encounters

31% ↓

decrease of total hospitalization costs

**Statistically significant outcomes (p<0.05) using Intention-to-Treat approach. **10.4% control vs. 3.1% intervention group*

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Check Out the Research Studies Behind our ROI Data

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ARTICLE OPEN

A randomized trial examining the effect of predictive analytics and tailored interventions on the cost of care

Mariana Nikolova-Simons[1✉], Sara Bersche Golas[2,3], Jorn op den Buijs[1], Ramya S. Palacholla[2,4,4,5], Gary Garberg[6], Allison Orenstein[7] and Joseph Kvedar[2,4,4]

This two-arm randomized controlled trial evaluated the impact of a Stepped-Care intervention (predictive analytics combined with tailored interventions) on the healthcare costs of older adults using a Personal Emergency Response System (PERS). A total of 370 patients aged 65 and over with healthcare costs in the middle segment of the cost pyramid for the fiscal year prior to their enrollment were enrolled for the study. During a 180-day intervention period, control group (CG) received standard care, while intervention group (IG) received the Stepped-Care intervention. The IG had 31% lower annualized inpatient cost per patient compared with the CG ($3.7 K, $8.1 K vs. $11.8 K, p = 0.02). Both groups had similar annualized outpatient costs per patient ($6.1 K vs. $5.8 K, p = 0.10). The annualized total cost reduction per patient in the IG vs. CG was 20% ($3.5 K, $17.7 K vs. $14.2 K, p = 0.04). Predictive analytics coupled with tailored interventions has great potential to reduce healthcare costs in older adults, thereby supporting population health management in home or community settings.

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INTRODUCTION

COVID-19 has profoundly changed health systems around the world and highlighted the importance of accelerating digital medicine[1]. In particular, telehealth use has surged in response to the COVID-19 pandemic due to its essential role in mitigating increased burden placed on health systems by providing quality care while safeguarding patients' and healthcare providers' own health and safety[2]. The US telehealth market is estimated to experience a staggering seven-fold growth by 2025, resulting in a five-year compound annual growth rate of 38%. By the end of 2020, the telehealth market is projected to have grown by 64%[3]. Across the telehealth market segments, virtual visits, and remote patient monitoring will propel the overall market, followed by mHealth and personal emergency response systems (PERS).

The World Health Organization's Global Strategy on Digital Health[4] has pushed healthcare organizations (HCOs) to evaluate their ability to broadly deploy telehealth-based population health programs to ensure safe, equitable, and meaningful access to healthcare services. One of the pioneers in telehealth is Mass General Brigham (MGB, formerly Partners HealthCare System), an integrated delivery network located in Massachusetts. It is comprised of two large academic medical centers as well as community hospitals. Partners HealthCare at Home (PHH), is an entity within MGB that deploys population health management programs leveraging many connected health technologies, including PERS.

The PERS is designed to help older adults to live independently in their homes by providing access to immediate assistance in case of medical emergencies that could lead to costly emergency department (ED) visits and hospitalizations. PERS consists of a help button worn as a necklace or bracelet that a patient may press at any time to connect to a 24/7 emergency response center. A response center associate obtains information about the situation and contacts either an informal responder (e.g., neighbor, a family member) or an emergency medical service (EMS, e.g., ambulance, police, or fire department) based on the patient's specific situation, and then follows up to confirm that help has arrived. Recently, PERS services have been improved with a predictive model that utilizes PERS data to identify patients at risk of ED transports[5]. Such risk predictions can support healthcare providers to proactively intervene and potentially prevent unnecessary healthcare utilization and costs in older patients. That is why such a predictive model was embedded in a Stepped-Care intervention as a first step, triggering nurse-driven interventions as a second step. To evaluate the impact of the Stepped-Care intervention on the healthcare utilization and costs of older patients using PERS we implemented a randomized controlled trial with 370 patients[6,7].

Many HCOs target costly interventions to their most expensive patients, e.g., the top 5% segment of the cost pyramid, who incur an outsized portion of healthcare costs[8,9]. Although these programs have demonstrated improvement in clinical outcomes, they have not always yielded the necessary cost savings[10–12]. Further, our previously published longitudinal retrospective study of healthcare costs of an older population has shown that the middle segment was persistently the costliest segment through all 5 years with the highest increase in annualized costs compared with the other segments[13]. Informed by these key findings, this study focuses on patients in the middle segment of the cost pyramid.

The study objective was to evaluate the impact of a Stepped-Care intervention on the healthcare utilization and healthcare costs of older patients using PERS. This paper focuses on evaluating healthcare costs associated with healthcare utilization of patients in the middle segment of the cost pyramid. The impact of the Stepped-Care intervention on healthcare utilization outcomes was presented in a separate manuscript[7] and summarized in the results section of this paper.

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ARTICLE OPEN

Predictive analytics and tailored interventions improve clinical outcomes in older adults: a randomized controlled trial

Sara Bersche Golas[1✉], Mariana Nikolova-Simons[2], Ramya Palacholla[1,3,4,5], Jorn op den Buijs[2], Gary Garberg[6], Allison Orenstein[7] and Joseph Kvedar[1,3,4]

This study explored the potential to improve clinical outcomes in patients at risk of moving to the top segment of the cost acuity pyramid. This randomized controlled trial evaluated the impact of a Stepped-Care approach (predictive analytics + tailored nurse-driven interventions) on healthcare utilization among 370 older adult patients enrolled in a homecare management program and using a Personal Emergency Response System. The Control group (CG) received care as usual, while the Intervention group (IG) received Stepped-Care during a 180-day intervention period. The primary outcome, decrease in emergency encounters, was not statistically significant (15%, p = 0.291). However, compared to the CG, the IG had significant reductions in total 90-day readmissions (68%, p = 0.007), patients with 90-day readmissions (76%, p = 0.011), total 180-day readmissions (53%, p = 0.020), and EMS encounters (49%, p = 0.006). Predictive analytics combined with tailored interventions could potentially improve clinical outcomes in older adults, supporting population health management in home or community settings.

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INTRODUCTION

Worldwide, older adults are becoming the largest population due to increasing longevity and lower fertility rates[1]. In the United States, it is estimated that by 2050, the proportion of adults aged 65 years and older will nearly double[2]. Multiple chronic conditions are prevalent in this population and are the most common cause of emergency department (ED) and hospital (re)admissions[3,4]. Further, management of these chronic conditions in acute care settings contribute to more than two-thirds of total healthcare costs[5,6]. These increasing costs necessitate the development of innovative digital health strategies to enable healthcare providers to achieve better health outcomes at lower costs. This marks a fundamental shift towards outcomes-based care and leverages proactive population health management to achieve the quadruple aim—improved health outcomes, patient and clinician satisfaction, and reduced costs. In addition, the COVID-19 pandemic profoundly emphasizes the need for shifting from reactive care at the hospital to proactive care at home[7]. This proactive approach can have a significant impact on the most vulnerable patients—older adults with comorbidities.

Partners HealthCare at Home (PHH) is a preventative homecare management system that offers general care as well as specialized services to patients within the Mass General Brigham (MGB). MGB is an integrated delivery network located in Massachusetts, comprised of two academic medical centers as well as community hospitals. The PHH population health management program leverages connected health technologies, including a Personal Emergency Response System (PERS).

PERS helps older adults to live independently at home by providing access to immediate assistance in case of medical emergencies that could lead to costly ED visits and hospitalizations. PERS is a remote patient monitoring service consisting of three components: (1) a help push button that is worn as a necklace or on the wrist, (2) an in-home communication system and (3) an emergency 24/7 response center. Patients can press the "help" button at any time to activate the in-home communication system that connects to the response center. The response center associate obtains information about the situation and contacts either an informal responder (e.g., neighbor, a family member) or an Emergency Medical Service (EMS, e.g., ambulance, police, or fire department) based on the patient's specific situation, and then follows up to confirm that help has arrived. We used PERS data of more than 500,000 users to develop and validate a predictive model that predicts the risk of 30-day ED transport use[8]. This algorithm is the foundation of CareSage, a care provider-facing patient risk assessment system that supports healthcare providers in assessing patient's risk of ED transport so they can proactively intervene and potentially prevent unnecessary healthcare utilization in older patients.

Healthcare expenditures in the United States are unevenly distributed across individuals and different segments of the population[9,10]. For example, the bottom 50% least expensive patients (B segment) spend only 3–4% on healthcare, whereas the top 5% most expensive patients (T segment) spend 50% of the total expenditures. The middle 45% of the population (M segment) accounts for the remaining 45% of the total cost. Accordingly, most healthcare organizations (HCOs) develop care management programs targeting the T segment[11,12]. However, our longitudinal retrospective study of healthcare costs of an older population has shown that the M segment was persistently the costliest through all 5 years with the highest expected annual cost increase compared with the other segments[13]. These findings highlight why this study focused on patients in the M segment, which, by definition, has nine times more patients than the T segment, and why we used predictive analytics to specifically identify M segment patients at high risk of adverse events. This risk identification is the first step in the Stepped-Care approach used as the intervention in this study, which triggers nurse-driven

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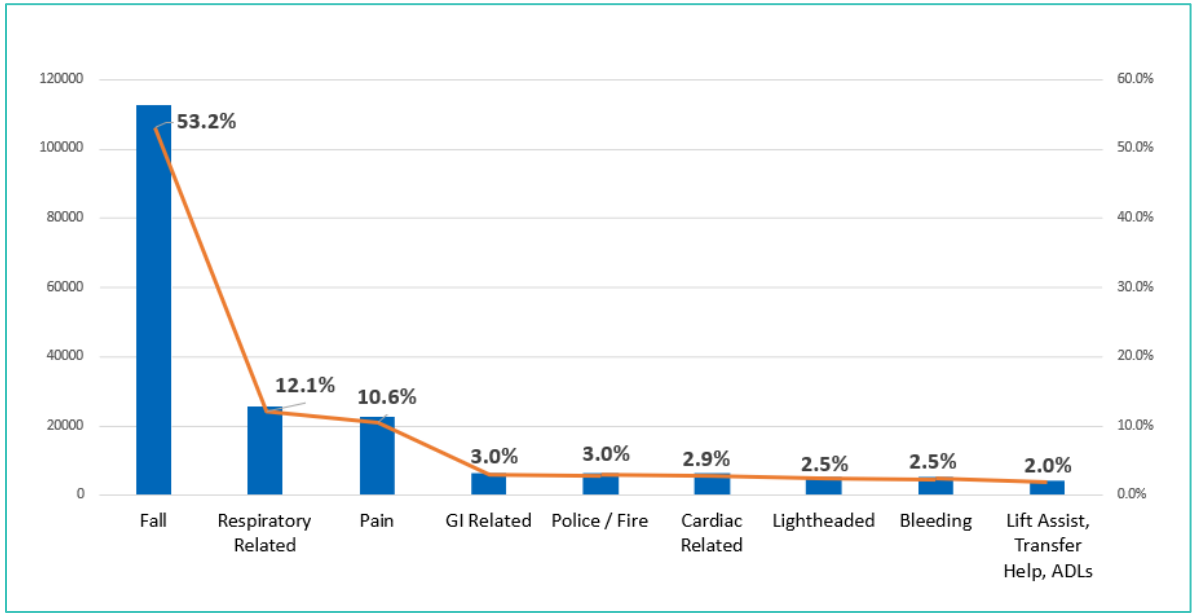
Early Intervention Improves Efficiency and Outcomes

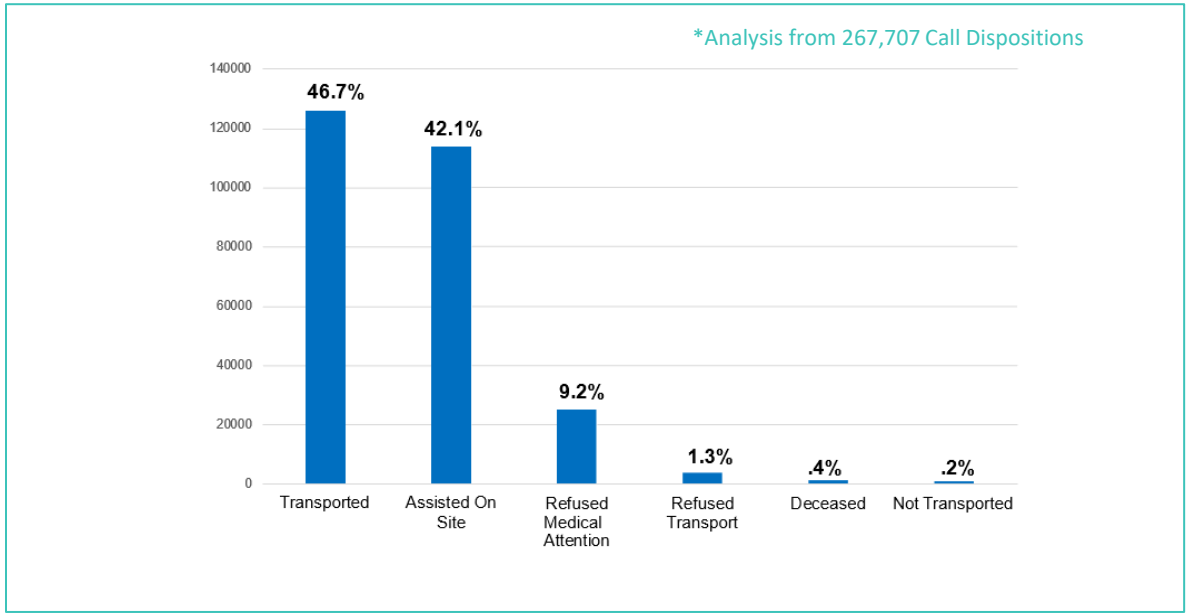
90% of alert calls do not require escalation

Top Call Reasons



- Over half of calls related to falls**(53.2%)**
- Many other reasons for calls captured in our rich database

Hospital Transports vs. Onsite Assistance



- Less than half **(46.7%)** resulted in a hospital transport

Creates opportunities for follow-up intervention

Earlier interventions improve outcomes and reduce hospitalizations/utilization costs

Opportunities

Opportunities

- A comprehensive PERS solution can improve health outcomes and decrease utilization, including hospitalizations, readmissions, and Emergency Medical Service (EMS) encounters
- PERS was shown to lower total hospitalization costs
- Digital health, including PERS, can improve member engagement and data capture to enable better care

Thank You

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