Home Telehealth (HT) technology provides a telemedicine tool for patients to take an active role in the management of their chronic diseases. HT works by allowing patients to transmit vital health data from their home to physicians’ offices and, in turn, receive health coaching from their providers based on the clinical data they transmit. A HT system generally consists of a standalone hub device that collects physiologic data from peripheral devices and connects the patient to the provider via interactive/audio/video capabilities.

HT tools include audio and video conferencing capabilities, allowing remotely located health care professionals to interview, observe and educate the patient. In addition, HT tools assist in the use of the peripherals or other medical devices. Furthermore, advanced HT tools have the ability to show full-motion video, which can be used to provide patient education.

A representative sample of these tools includes Bosch Health Buddy and Philips TeleStation.

Use Case

Telemedicine approaches may not be appropriate for all Americans suffering from chronic disease, but recent estimates suggest a sizeable portion may benefit.

- The Veterans Health Administration (VHA) estimates that 75,000, or about 50 percent, of its total patient population could be cared for with home telemedicine technologies.¹
- HT tools, with their interactive capabilities, offer the potential to positively impact a broader segment of the chronic disease population compared to other approaches like traditional remote patient monitoring (RPM), which have been shown to be effective primarily for the most serious chronic disease patients.

Despite the large number of HT technologies available in the marketplace, the current installed base of HT devices still remains relatively small, particularly in light of the immense target population of chronically ill patients. The majority of HT devices currently in use are still part of pilot or demonstration projects.

- The Health Buddy technology is currently being used by the Department of Veterans Affairs in 50 different health management programs across 18 Veterans Integrated Service Networks. The technology is also being used in the Medicare High Risk Demonstration project with approximately 1,000 patients in California.
- Centura Health at Home, Colorado’s largest health care system, is currently offering LifeView to 167 Medicare members with heart failure, COPD and diabetes.

Some HT devices are more well-known and well-established.

- IDEAL LIFE Wireless devices have been used by The Roanoke Chowan Community Health Center (RCCHC) in more than 28 counties throughout North Carolina and by CareMore, a California-based company operating 26 care centers serving more than 50,000 Medicare Advantage patients.²

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² IDEAL LIFE. Interview. January 2012.
Clinical Benefit

It has been well-established in the literature that HT tools promote improved clinical outcomes by providing patients with a means to actively monitor their condition. Specifically, HT tools have been found to improve health status by reducing the risk for emergency room visits and hospital readmissions, decreasing hospital length-of-stay and improving survival rates.

- Reduction in Emergency Department (ED) visits:
  - In a study of 40 in-home patients conducted by RCCHC those who used the Health Buddy HT over a six-month period had 69 percent fewer ED visits compared with the previous six months.\(^3\)
  - A pilot study for the LifeView device found a 100 percent reduction in ED visits over a six-month period with the use of HT.\(^4\)
  - In a yearlong study of 791 chronic disease patients who used the Health Buddy system through the VHA, a 40 percent reduction in ED visits was achieved.\(^5\)

- Reduction in hospitalizations and hospital readmissions:
  - The largest study of HT to date, conducted by the VHA over an 18 month period, found a nearly 20 percent reduction in hospital admissions for the HT study group, compared to a 4.6 percent decrease in the entire VHA (non-telemedicine) population.
  - The RCCHC study noted a 71 percent reduction in hospitalizations with the use of HT over approximately one year.\(^6\)
  - A Tufts Medical Center study of 188 heart failure patients over a 90-day period following the initial hospital stay found that hospitalizations related to heart failure were reduced by 72 percent with the use of HT and by 63 percent for other cardiovascular conditions.\(^7\)
  - A Community Health Partners in North Carolina study of IDEAL LIFE Wireless found the total number of emergency room visits during the six months before implementation was 127 as compared to only 49 visits during implementation and 27 during the three months after discharge (n=73).\(^8\)
  - A CareMore study reported a hospitalization rate 24 percent below average.\(^9\)

- Reduction in hospital length of stay:
  - The VHA study also found a 25 percent reduction in the number of bed days.\(^10\)
  - A separate, year-long study found a reduction of 60 percent in hospital bed days.\(^11\)
  - The RCCHC conducted a three-year feasibility study using IDEAL LIFE Wireless devices of 198 patients and found that the total number of hospital-bed days was 199 during the six months before implementation as compared to only 99 during the six months of implementation and 70 during the 24 months after discharge.\(^12\)
  - A CareMore study reported hospital stays 38 percent shorter in length using IDEAL LIFE’S devices.\(^13\)

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\(^6\) Britton, Bonnie (2008).


\(^8\) IDEAL LIFE. 2012

\(^9\) Ibid.


\(^12\) IDEAL LIFE. 2012.

\(^13\) Ibid.
Better survival rates:
- In the Trans-European Network Homecare Monitoring Study, survival rates were substantially better for patients receiving RPM compared to usual care (27 percent greater for RPM patients).\(^{14}\)

**Financial Analysis**

The cost of HT technology can be split into two portions: device costs and service fees.

- **Device Costs:**
  - One-time device costs include the purchase of all required devices including the main appliance (or base unit) and any additional peripherals (blood pressure monitors, scales, etc.).
  - The cost of HT devices varies substantially based on the level of sophistication.
  - Advanced devices, such as LifeView, cost several thousand dollars, whereas devices at the lower end of the cost spectrum are only about $100 per device.

- **Service Fees:**
  - HT technologies also incur ongoing service fees, usually billed on a monthly basis.
  - This covers the use of the IT systems which collect, manage and disseminate data collected from patients.
  - This often includes access to web-based tools and integration with electronic medical records.

Overall, the costs of HT technology must be considered inclusive of device and service fees, and over an extended period of time. According to an estimate by the VHA, the cost of care coordination/home telehealth is around $1,600 per patient, per year. Despite the high price tag, HT technology is perceived as cost effective for two reasons.

- **First,** it reduces hospital costs.
  - A meta-analysis of three programs using the Health Buddy technology showed that patients who used the device to manage heart failure experienced a decrease in hospitalizations and emergency room visits (for all types of illnesses), reducing average annual costs from $11,549 to $3,263.\(^{15}\)
  - The RCCHC study found a similar reduction in hospital charges; hospital charges for the 40 patients followed prior to the use of telehealth amounted to $1,240,506 over six months, compared to charges of $229,919 during six months of HT use, an 81 percent reduction.\(^{16}\)

- **Second,** HT can reduce the need for intensive home health service and institutional care services, such as 24-hour monitoring at a nursing home.
  - The VHA estimates that the cost of comprehensive home health services for chronic disease patients is approximately $13,121 per patient per year and the cost of nursing home care averages around $77,745 - high costs compared with the $1,600 per-year cost for HT.\(^{17}\)
  - An analysis of the Trans-European Network Homecare Monitoring Study resulted in an ROI of 2.1 for the home telemonitoring program compared with similar services through a nurse telephone support program.\(^{18}\)

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\(^{16}\) Britton. 2008.

\(^{17}\) VHA Home Based Primary Care (HBPC) is provided by an interdisciplinary team of practitioners including nurses, social workers, physicians, therapists and dietitians. The services provided are more intense and frequent than traditional models of home health service provision and are intended for patients with complex, chronic, progressive diseases.

**Barriers to Adoption**

- **Cost of Supporting Devices:** Most HT technology requires substantial upfront acquisition costs, often much as several thousand dollars per device.

- **Reimbursement Issues:** Widespread adoption is dependent on the reimbursement model, and many third-party insurers do not cover the cost of these tools.

- **IT Infrastructure:** While the prevalence of EMR systems is increasing and is likely to accelerate with additional government funding, smaller primary care practices are unlikely to have such technology.

- **Behavioral and Cultural Change:** A concerted effort on the part of providers is required to aid physicians, as incorporating HT technology into their existing workflows and clinical activities represents a shift in professional practices.

- **Legal and licensure barriers:** As larger, multi-state integrated care networks begin to implement HT, legal and licensure issues may become more prominent over the long-term.

**Next Steps to Implementation**

1. **Advocate for Reimbursement:** Data suggest that HT technologies are clearly effective in improving both clinical and financial outcomes. A fundamental question, however, is who pays for these technologies? In turn, a next step is to address payment challenges by advocating for reimbursement under current fee-for-service models and future bundled payment models where providers will be rewarded for cost effective care. This could be aided through the development of cross-cutting strategies that emphasize the importance of HT technologies.

2. **Make it Opt-Out, Not Opt-In:** For HT technologies to be widely adopted, a standard protocol should be created in which providers are automatically enrolled in HT technologies within their institutions. Currently, HT technologies follow an opt-in, voluntary approach. The development of an opt-out standard protocol for HT technologies would help to increase adoption by providers, which in turn would improve clinical and financial outcomes for patients.

3. **Opportunity for the Safety-Net:** A critical question surrounding the topic of HT technologies is who pays for them, but perhaps equally important is the question of who pays for HT tools when there is a lack of money available? Advocating for reimbursement, therefore, should not just be generally focused on current fee-for-service models and future bundled payment models. Rather, strategies should be developed around how to incentivize reimbursement for HT tools within the Medicaid population, specifically those that live in rural areas.